## NOTICE BY THE PUBLISHING COMMITTEE.

The American Journal of Pharmacy has now reached its 27th volume. On an examination of the stock of the Journal, the Committee find that three of the volumes are wholly or partially out of print—viz. vols. 1 and 2 of the 3rd series, and vol. 1 of the second series. All the remaining Volumes, twenty-one in number, they can supply on demand. Believing that the work embodies a large amount of information, extremely valuable to Apothecaries, Druggists and Physicians—comprehending, in fact, a faithful record of the development of Pharmaceutical science and inventions during the period of its issue, now twenty-five years, both in Europe and America, the Committee consider that no Pharmaceutical library should be without it.

Besides the standard pure applied science embodied in this work, a large number of formulæ are contained in it including many, which, though not officinal, are more or less valuable and in use.

As an inducement to Subscribers to complete their sets as far as possible, the Committee offer the back volumes to the 24th inclusive, at the reduced price of $1.50 each, nett.

The volumes 25 to 27 inclusive, are held at the publishing price, $3.00, unless a full set is taken, in which case they will be supplied at $2.50 per volume.

The Committee offer the subscription price in money for the 4th number of the 1st volume, published January, 1830; for the complete 2d volume, commencing April 1830; and the complete 7th volume, commencing April, 1835.

CHARLES ELLIS, ALFRED B. PATTON, } Committee.
JOSEPH REYNOLDS, EDWARD PARRISH, }

THE

# AMERICAN JOURNAL OF PHARMACY.

SEPTEMBER, 1856.

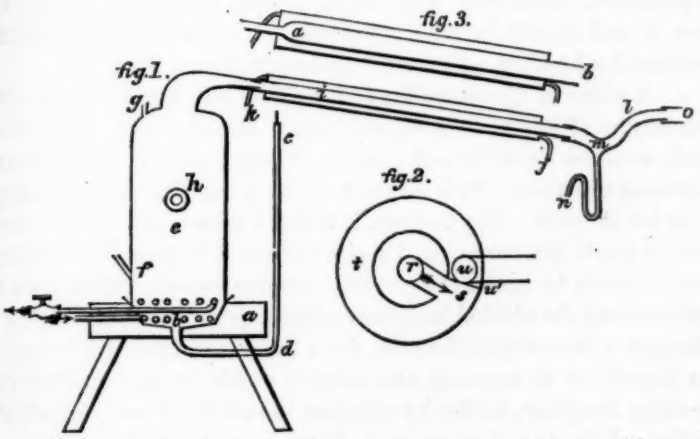
## APPARATUS FOR THE PREPARATION OF ETHER BY STEAM.

By Edward R. Squibb, M. D., U. S. Navy.

Assistant Director U. S. Naval Laboratory.

Experience in making ether once or twice a year, for some years past, has led to the following convenient apparatus for its production by steam heat. The character of the product obtained, and the simplicity, cheapness, and safety of the apparatus, seem to warrant the publication of the plan somewhat in detail; for although no new principles are involved, yet those who practice pharmacy will hardly fail to acknowledge the usefulness and novelty of communicating detailed practical results that have accumulated from carefully conducted experiments.

The apparatus is described in the order in which it is best made by the workmen. The scale of the drawings being one twenty-fourth of an inch to the inch, the measurements are omitted in description.




*a.* Stand for the still, made by screwing together two thicknesses of 2 inch pine plank, crosswise to prevent warping by the

heat. The block thus made is turned out in the center in the form of a cup or pan with flaring sides. Into this depression a sheet of lead of 8 lbs. to the square foot, is made to fit accurately, by hammering, being allowed to project an inch above the surface of the stand.

*b.* A length of 15 feet of "extra strong ½ in. lead pipe," is next made into a worm or coil of the form of a compressed mattress spring; that is, one flat, or "flemish" coil above the other, the two being continuous in the center. This coil is let down into the wood and pan so that the entrance and exit pipes are held within the thickness of the stand, and so that the upper coil rises but little above the brim of the pan. Where the entrance and exit pipes pass through the leaden pan, the lead is "chased" up carefully into contact with the pipe, and the joints soldered outside the pan. A piece of ½ inch iron pipe with a screw thread on one end, is soldered by the other end to the lower lead pipe for convenience in connecting the apparatus up to the steam openings from the boiler; and a ½ inch "globe valve" is attached to the upper lead pipe in order to regulate the steam exit, and consequently the pressure and temperature in the coil. The joints of the iron and lead should be "bolt joints" and not "wiped joints," as the latter, though neater in appearance, invariably leak under steam pressure. About 13 feet of coil should be within the pan, giving a surface of steam contact for heating, of say 234 square inches.

*c.* A piece of the same kind of lead pipe is fitted closely into the center of the bottom of the pan, soldered outside, and then well caulked or "burned" inside, by melting the lead contact surfaces together. This serves both as a feeding and discharge pipe for the still. For feeding, it is fitted with a cork, perforated with a small glass tube, and a piece of small india rubber tubing long enough to reach the elevated feeding vessel. This plan of introducing the alcohol has great advantage over that of passing it through a tube within the still, for a tube within the still becomes so heated as to vaporize the alcohol within it, and render the feeding irregular, whilst by this plan the alcohol is very regularly delivered in the bottom and hottest part of the still, and can only get to the surface by passing, in a state of vapor, through the heated acid.

For discharging the still, the cork and tubing are removed, and the pipe bent down at *d*. This obviates the necessity of the troublesome plugs and stop cocks.

*e*. A cylinder of sheet lead, of 6 lbs. to the square foot, is made of a diameter to correspond with that of the inside of the pan at the surface of the stand. The joint or seam in this cylinder is made by "burning" the two edges together, either by red hot irons, or by Dumas' inflamed jet of hydrogen, but best by the irons, as this makes a more solid joint. The lower edge of the cylinder is rasped off upon a bevel corresponding to the inclination of the sides of the pan, and the rim of the pan is scraped bright. The cylinder is then set in its place, and turned a few times till the contact is as perfect as possible, when the outside sulcus is filled up with solder and "wiped" smooth.

A shoulder is next turned upon the upper edge of the cylinder, and the cover and head formed and soldered in place without unusual precautions, as the acid never reaches the solder of these joints injuriously.

*f*. A hole is then bored obliquely into the still at *f*, and a piece of $\frac{3}{8}$ inch lead pipe fitted tightly into it and soldered outside. Into this lead pipe a tubular thermometer is passed, and the space between the lead and the glass through the whole 2 inches of pipe well filled with a putty made of carbonate of lead, or of sulphate of baryta.

*g*. Another short piece of $1\frac{1}{4}$ inch thin lead pipe is soldered on at *g*, for charging. This is stopped with a cork.

*h*. On the front of the cylinder, about 13 inches above the rim of the pan, a circular piece of sheet lead is soldered, like a patch, so that the parietes may be double thickness there. Through this patch or outer layer only, a hole $1\frac{1}{4}$ inches in diameter is bored, by means of a brace and bit. Through the inner layer, or proper wall of the cylinder, a hole 1 inch in diameter is bored, upon the same center as the first hole. This leaves a rabbet of $\frac{1}{4}$ inch all round the inner hole, into which a piece of retort bottom or other thin glass is fitted and well puttied. This forms a very convenient window by which to regulate the feeding cock during the process. The quantity of the charge should be so regulated that the surface of the acid liquid when heated to boiling should come nearly up to the window, or be

just fairly in sight only; for if it rises to the window no ordinary means will prevent leaking after a short time.

*i.* An ordinary Liebig's condenser is adapted to the still, and kept cool during the process, by a current of water entering through india rubber tubing at *j*. The water from the exit pipe *k*. is conducted by india rubber tubing into the first, or alcohol condenser tub as required, to regulate the temperature of the water there to about 105°.

*l.* A curved piece of thin 1¼ inch lead pipe is fitted to the end of the Liebig, having a small lead pipe *n* soldered into it at *m*, to give exit to the watery acid liquid condensed in the Liebig. This small lead pipe is "trapped," or bent so that a portion of it may be always filled with liquid, and vapors thus prevented from escaping. The farther extremity of *l* fits into pipe *r* of the first, or alcohol condenser at *o*, and is regulated in its length and inclination by the highth at which the condensers stand. It should be quite as long as represented, and with quite as much rise.

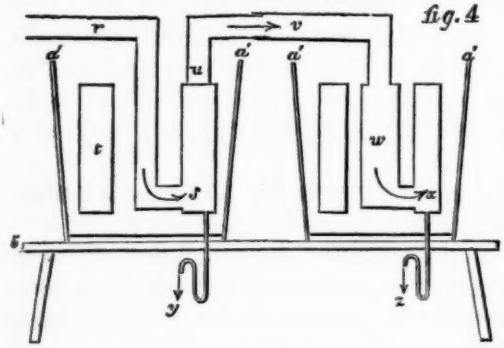



*fig. 4*

*a'*. Two tubs for the first and second, or warm and cold condensers. The first for separating the alcohol from the ether vapor, is largest, in order to accommodate the larger quantity of more expanded vapors. The first tub is kept filled with water at 105° to 110°, and the second with ice, or cold water.

*b'*. A common stand for the two tubs.

These condensers and tubes, made from 3 or 4 lbs. lead, or from well tinned iron, are essentially hollow cylinders, with an inside vertical partition to prevent the vapors from passing through them without circulation. The vapors are conducted by tubes *r* and *v* into these hollow cylinders at *s* and *x* in front of the vertical partition *u'*, fig. 2. The vapors must then pass entirely

round within the hollow cylinder to get exit, as vapor by *u*, or condensed by *y* and *z*, these three outlets being upon the side of the vertical partition opposite to the inlets. The condensers are each furnished with three sheet iron feet about 3 inches high, upon which they stand, and by which they are fastened by screws to the bottoms of the tubs. All the tubes and passages are made large to provide for the slow circulation of the vapors, as this slow circulation is *the* important point in condensation.

The still as described, including the thermometer and "globe valve," cost 45 dollars, and the remainder of the apparatus, except the Liebig, which is for general use, cost about 40 dollars, or less.

The best practical charge and proportions of materials at which I have as yet arrived, for this still are,

Of Alcohol s. g. ·820 3½ galls. = 23 lbs. 12 oz. av.
" Sulph. Acid " 1·846 2¼ " = 34 " 3 " "

This mixture commences to boil at 260° to 264° with foaming for a few moments at first, but soon settles down to a steady ebullition at 266°, its true boiling point. As far as my experience goes, this 266° is the most economical temperature for etherification with such materials. Hence, a coincidence between the boiling point of the mixture (and a mixture can be made, that will boil at any desired point between 176° and 620°) and the best temperature for etherification is the desideratum in this process. A mixture like that of the U. S. P., which boils much below the temperature for etherification, drives over much undecomposed alcohol; whilst a mixture whose boiling point is much above the point of etherification, produces more light oil of wine and olefiant gas.

The above mentioned charge, at a distance of 16 feet (of conducting pipe) from the steam boiler, is easily kept boiling with a pressure of 40 lbs. to the square inch in the boiler, and although the process will go on well with a pressure of 35 lbs., yet not so conveniently or rapidly.

At least 18 gallons of alcohol may be fed economically into this charge in 12 hours, and about 14 gallons of crude ether of s. g. ·747 obtained. The alcohol and ether obtained, beside, from the first condenser, will be equal in value to the acid and half the fuel. Such is a rough estimate of the crude products of one day's work.

In working the apparatus for three consecutive days, however, 55 gallons of alcohol, and 101 lbs. of sulphuric acid were used. From these materials 26½ gallons of rectified ether, of s. g. ·728 were obtained. Beside this, 5 gallons of alcoholic ether s. g. ·795 (for tannic acid process) and 2½ gallons of alcohol s. g. ·840, were obtained as collateral products from the same materials.

This is what the apparatus has done, but with more experience and better management it is doubtless capable of doing better, so that at the next operation there is reason to expect a yield of 28 gallons of ether s. g. ·728 from 51 gallons alcohol s. g. ·820, and a value in collateral products equal to the expenses of the process, if wear and tear of apparatus be excluded.

An improvement that suggested itself at the last operation, but which as yet has only been experimentally tried, appears likely to render practicably applicable the method of Soubeiran, by which he proposed to obtain pure concentrated ether at one operation. This consists in substituting for the ordinary Liebig's condenser, a special one of the construction shown in figure 3.

A layer of sponge or curled hair being placed at *a*, the large tube is to be loosely filled with lumps of the dried residue of the ammonia process, (chloride of calcium and hydrate of lime,) or, more loosely still with lumps of quick lime. The hot vapors are thus deprived of acid entirely, and of water, in a measure, and both the alcohol and ether are obtained in good condition. But how long the good effect would continue to be produced without renewing the contents of the cooler, remains yet to be determined, whilst upon this point the practicability of the plan entirely depends.

If this fails, however, there is no good reason why the mixed vapors from such a still might not be made to bubble through a warm solution of chloride of calcium and milk of lime before reaching the condensers, provided the feeding vessel be sufficiently elevated to oppose the increased vapor tension in the still, and provided the proportion of alcohol in the charge be so varied as to maintain the same boiling point under the increased pressure.

I am not aware that Soubeiran's idea of obtaining ether at one operation has ever been successfully applied, if it has, the methods and results have not been published.

*U. S. Naval Laboratory, New York, July* 1856.

---

## NOTE ON THE STRENGTH OF COMMERCIAL ALCOHOL.

By John Buck.

Prof. Procter:

Dear Sir,—I have read in the journal the article of Mr. Mead, also the replies of Mr. Sharp and Mr. Pile, and it does not seem to me that either of them explain the dilemma in which Mr. Mead seems to be with regard to his alcohol. Mr. Sharp says nothing about it, merely answering his question on the Government standard of the different proofs, and Mr. Pile congratulates Mr. Mead on his getting a better article than he contracted for, an *accident* which he is confident does not occur elsewhere. Now I do not think it is a matter of accident, nor that he got a better article than he contracted for, but whether it is peculiar to this vicinity I cannot say. I do not consider myself capable of giving a scientific explanation of the subject, but having got into the same dilemma, and having arrived at the same results of which he speaks, I was led to look into the subject, and will state to you how I explained the matter to *my own* satisfaction.

I had tested several barrels of alcohol which I purchased at different times, which were marked 80 per cent. and had found them to be 90 per cent. by volume; I concluded there could be no mistake, but that 80 per cent. with them must be different from what I understood as 80 per cent.

I took some pains to enquire of different distillers, what per cent. by volume they represented by their 80 per cent. alcohol, and I found they did not seem to understand much about the use of any other instrument except the one used by themselves, (it is not the same as those used by Government.) The only information I could get was, that when they say a spirit is 80 per cent. they mean that 100 gallons of that spirit will require 80 gallons of water to reduce it to proof spirit; that is, 100 gallons of 80 per cent. alcohol is equal to 180 gallons proof spirit, (100

of 90 per cent. is equal to 190 proof; 100 of 70 per cent. to 170 proof, and so on,) proof spirit being equal parts by measure of pure alcohol and water.

Now take Mr. Mead's statement; he says "he bought his alcohol for 80 per cent. and found it to be sp. gr. 0·834, which would be nearly 85 per cent. by weight, and 90 per cent. by volume." If it was 80 per cent. (according to the distiller's scale) 100 gallons of that alcohol would make 180 gallons of proof spirit; now proof being equal parts of pure alcohol and water, it would be composed of just 90 gallons of pure alcohol and 90 gallons of water; therefore the alcohol which he purchased would contain 90 gallons of pure alcohol in 100 gallons, or in other words it would be just 90 per cent. by volume, or about 85 per cent. by weight, which will correspond with his and my own experiments.

If the distiller's scale is as I state it, am I right in my conclusions? If I am, and if it is a rare thing to find it elsewhere, our distillers deserve credit for making their alcohol so near the standard laid down in the U. S. Pharmacopœia, which is sp. gr. 0·835 or 85 per cent. by weight.

I do not know the fact, but infer from the statement of the distillers, that the hydrometer used by them is Sike's, or one of similar construction, and that perhaps it may more properly be said to be 80 per cent. *over proof.*

I see that Mr. Gutteridge, in his tables, would give the sp. gr. 0·835 to be very near 57 per cent. over proof, but Pereira in the article on alcoholometry says that Mr. Gutteridge's statement does not coincide with experiments which he has made on the same subject.

I was much pleased with the remarks of Mr. Pile on the difference in hydrometers, as it explains to me what I have been trying without success to solve. I purchased of Mr. J. Wightman, Boston, one of Luhme & Co.'s alcoholometers, graduated by Tralles & Richter's scales; after taking it home, I tried it with some alcohol, to see how it agreed with the tables in Wood & Bache's Dispensatory, and to my surprise it gave a different result. Then to determine if either was correct, I took it to the Custom House, and through the kindness of Mr. Lewis tested it with their's, (supposing I could depend upon their's as a standard instrument, it being made expressly for Government use;) the

result was, that the Tralles scale on my instrument agreed with their's in every trial. I then concluded the trouble, if any existed, must be in the Richter scale; but how one scale should be perfectly correct and the other wrong, I could not understand, supposing that after they had graduated one correctly, it would be just as easy to adjust the other to it right, as to have it wrong. I tried to find a table of Richter, but without success. I then applied to Mr. Wightman for an explanation. He had just received a new lot, and we compared them together and found them to agree with the one I had. He said he was about sending an order to Berlin for some more goods, and if I would make a statement of the trouble I found, he would send it to the fountain head for explanation. I did so, stating the disagreement I found between Richter's scale as appeared on their alcoholometer, and all other tables for alcohol by weight that I could find. The reply came in a letter to Mr. W., containing matters of business, therefore it is in his possession; but the amount of it was, that they knew nothing about the tables which I mentioned, but that Richter was correct, and that their alcoholometers were made strictly by his scale, and were warranted correct both by volume and by weight. They referred me to page — Ure's Dictionary for Richter's scale, but I have not been able to find it either in the American or English edition.

The Government alcoholometer as used in the Boston Custom House, is made of glass, with a thermometer connected; they are manufactured expressly for Government, in Berlin. They have but one scale, and that is Tralles', so that all their liquors are marked so much *by volume.*

While at the Custom House testing my hydrometer, I saw the book of tables used in connection with their instrument, from which I copied the following:—

*Government Standard of Proofs.*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1st | proof | anything, | | | | 50 | per cent. | by volume. |
| 2nd | " | " | from | 50 | to | 53.3 | " | " |
| 3d | " | " | " | 53.3 | to | 56 | " | " |
| 4th | " | " | " | 56 | to | 67.7 | " | " |
| 5th | " | " | " | 67.7 | to | 79.3 | " | " |
| 6th | " | " | over | 79.3 | | | " | " |

Hoping I may have thrown a ray of light on the subject refered to,

I remain yours truly,

JOHN BUCK.*

*Chelsea, Mass., July 8th,* 1854.

---

## IMPROVED METHOD FOR CARBON AND HYDROGEN DETERMINATIONS IN ORGANIC ELEMENTARY ANALYSIS.

By EDWARD R. SQUIBB, M. D., U. S. Navy.
Assistant Director U. S. Naval Laboratory.

In making a large number of combustions of substances containing nitrogen (coal analyses for technical purposes,) the writer was led to substitute rolls of copper wire cloth for the copper turnings required to decompose the oxides of nitrogen formed in the combustion tube. These rolls were made from wire cloth of about 80 threads or wires to the inch, by rolling slips 3 inches in breadth, around pieces of glass stirring rod three-sixteenths of an inch in diameter, till the size of the roll was such as to fit easily into the combustion tube. The cut ends of a few of the terminal wires were then bent down and hooked into the meshes of the outer lamina of the roll to secure it from springing open when out of the tube. A number of such rolls, sufficient to fill a long straight tube of the same size as the combustion tube, were made and reduced together at one operation, by hydrogen on the combustion furnace, cooled in a current of hydrogen, the hydrogen displaced with dry air, and the rolls then corked up in the tube for use. These rolls answer the purpose quite as well as copper turnings, and are much more easily, conveniently, and accurately managed, as they may be pushed from the reduction tube into the combustion tube by a glass rod, one after another as required, without being touched, and without any risk of acquiring moisture from the atmosphere. As they are taken oxidized from the combustion tube after the combustion, they are returned to the reduction tube behind the reduced rolls till all have been used, when they are again reduced together as before.

[* NOTE.—This letter was not intended for publication, but deeming its hints useful to our readers, we have taken the liberty of printing it here. —EDITOR.]

From the convenience and success attending the use of such rolls in this manner for this purpose, it was but a step in the same direction to adopt them, when oxidized, as substitutes for the oxide of copper, in the tube to furnish the oxygen necessary for combustion. A very compact roll, 6 inches long, was made so as to fit the combustion tube tightly, and was forced into its place from the largest end of the tube leaving about 7 inches of the tube behind, and 4 inches before it, vacant. The tube thus prepared was then placed upon the furnace as for a combustion, and the copper surfaces of the roll thoroughly oxidized at a low red heat in currents of dry air and oxygen. The tube was then in condition for immediate use; and each successive combustion afterward left it in precisely this condition, ready for the next succeeding one.

The combustions were made, as is now the common practice, in a thin straight tube open at both ends, protected and supported in a shallow trough of wire gauze. The fuel used was common illuminating gas, supplied through several stop cocks, and burned above a wire gauze after due admixture with air in the common way. The prepared substance was weighed, introduced and burned in a boat-shaped piece of platina foil, fitting the tube well, but easily. A roll of reduced copper was placed behind the boat, and another in the anterior end of the tube. The tube was heated gradually first from the anterior end toward the boat, then from the posterior end toward the boat, and finally the boat itself was heated. The heating and the first part of the combustions were made in a very slow current of air admitted through the dessicators, (concentrated sulphuric acid, potassa, and chloride of calcium) in bubbles about 2 seconds apart. After half an hour, or when the flow of the gasses became slow, the slow current of air was replaced by a more rapid current of oxygen, and this continued till the anterior copper roll became fully oxidized. The heating was then discontinued, and after a few moments a slow current of air resumed for a short time. The results were very satisfactory.

Some of the advantages of the suggested method are as follows.

The copper surfaces only being oxidized, the metallic continuity of the wire cloth serves to distribute the heat equally in all directions, whilst the part of the tube least accessible to the

heat, namely, the center, is occupied by a bad conductor, to the exclusion of any portion of the gases to be burned.

The oxidized copper surfaces fill the tube more perfectly than the oxide of copper by the usual method, and are so easily permeable that the gases more readily and more slowly percolate the roll under circumstances more favorable to perfect combustion. Then as portions of these surfaces are reduced during combustion, the reduced metal does not protect or shield the oxide not yet reduced, from contact with the gases, but from being distributed with or behind the line of deoxidation is in the most active condition, and the best position for decomposing the oxides of nitrogen that may form. Hence, probably, the circumstances, that the reduced roll placed in the anterior end of the tube commonly remains quite free from visible oxidation till the combustion is nearly finished, and may only be necessary as a precautionary measure.

The rolls, by the readiness with which they conduct and distribute the heat, admit of perfect combustion with less intense heating, and thus measurably preserve the tube from being softened, whilst they strengthen and keep it in shape if it softens, so that the distribution and flow of the gases can never be obstructed or rendered irregular by this not uncommon accident to thin and good tubes.

They effect a very considerable economy in time and expense, and require much less skill and experience in order to attain to the same, or a greater degree of accuracy, than by the common method.

On the point of accuracy, however, it is necessary to state that the writer has never used the rolls for furnishing oxygen in any delicate or scientific analyses, neither has he tested the method upon any substance the composition of which was accurately known beforehand. The method is well adapted to the large class of technical analyses daily required, and is suggested that it may be improved in its design and application, for the benefit of the daily increasing number of chemists and geologists, upon whom such analyses devolve. At the same time, in practice thus far, it *appears* well adapted to make analyses of the greatest accuracy.

*U. S. Naval Laboratory, New York, May* 1856.

## NOTES AND QUERIES IN PRACTICAL PHARMACY.

The following desultory observations have been suggested from time to time by the every day occurrences in the experience of the writer. They are thrown together without any attempt at arrangement, and are offered as a sample of what might be put under the above head, so as to form, in time, a very valuable collection, if thoughtful and inquiring pharmaceutists would but give their attention to putting on record facts and queries of an analogous kind.

*Compound Syrup of Squill.*—The writer, in reflecting upon the mode of securing the best results in making this preparation, was led to try the experiment of exhausting the squill and senega separately *by displacement*, each with its appropriate menstruum, namely the senega with the diluted alcohol, and the squill with diluted acetic acid, mixing the two solutions thus obtained, evaporating to one half, adding water if necessary after filtration, and proceeding as for syrup. It is believed that the small quantity of acetic acid present in the syrup as thus prepared, acts beneficially in four ways. 1. More perfectly extracting the squill. 2. Preventing the crystallization of the sugar. 3. On the other hand obviating the tendency to fermentation in the syrup. 4. As an adjuvant in the solution of the tartar emetic. In preparing the squill for displacement a handful of well washed sand thrown upon it will enable any one to triturate it to a magma in a wedgewood mortar after it has been swollen by maceration. I prefer this practice, because I am sure that the root is thus sufficiently divided to enable the menstruum to extract all the soluble portion, while in most samples that I have seen, it is in such a condition that if put into a mortar it cakes under the pestle, or in a mill it will clog it so as to render it impossible to grind. I have obtained on two occasions the most satisfactory results from the process above adverted to.

*Colchicum Seeds.*—Can you or any of your correspondents give me a hint as to the best method of reducing these refractory little nodules to powder? I have tried them with pestle and mortar and with mill, and subjected them to the action of steam until they were partially torrefied, but with very unsatisfactory results. I wished to prepare the wine of colchicum seed, and

was obliged after a two days' skirmish with four ounces of them, to put them into the menstruum not half so well powdered as I could wish.

[We know of no better method of comminuting these seeds, than by first drying them well and then subjecting them in small quantities at a time to the action of the pestle in an iron mortar. Every thing depends on the proper relative curves of the pestle and mortar. They should have nearly the same radius.—EDITOR.]

*Displacement Process.*—One hint to beginners. See that your lower diaphragm fits well, and that the cloth stretched over it is equally engaged all round its edge, between it and the body of the instrument, else you may have your packing to do all over again from the clogging of the beak. Another thing, you can pack arnica and chamomile, and substances of similar texture, much more evenly and closely, after putting them through Swift's drug mill, or some similar machine, than you can without so doing, and obtain a better result.

*Tinctura Ferri Muriatis.*—I have noticed one or two articles upon this subject in recent numbers of the journal, and now offer a suggestion. Is not the difficulty complained of and often experienced in dissolving the carbonate of iron in the acid, due to the careless preparation of the former? I am induced to believe so, from a recent occurrence in my establishment. A lady to whom I had sold two ounces of the carbonate of iron, returned it on account of the differencc in taste and therapeutical effect from what she had experienced from other samples which I had sold her. I immediately examined it and found indeed that it was, to say the best, a very carelessly made preparation. There was some chalybeate taste, but a nauseous saline taste was the most marked feature. It was not subjected to analysis, because a notable mixture of sulphate of soda was too evident to be mistaken. This occurrence suggested the query whether the difficulty of dissolving some samples of carb. ferri in muriatic acid might not be due to some impurity of the salt. And I am the more disposed to think so, as the last time I made tinct. ferri muriatis, the carbonate of iron employed was entirely dissolved by the acid, without the aid of heat, or anything else but stirring with a glass rod.*

*[NOTE.—The difficulty arises most frequently where the acid has the proper strength, not from impurity but from the dehydration of the subcar-

"*More Poison in Soda Water.*"—How much soda water is impregnated with metallic carbonates in consequence of fragments of solder and chips of copper lying loose on the inside of the fountain? I ask this question, because this spring I received a new fountain, just from the machinist's hands, and hearing a rattling on the inside, I went to work and extracted between two and three ounces of drops of fused solder, as well as a chip of copper which were lying at the bottom of the fountain. *Verbum sapientibus sat.* H. T. C.

*Portland, Me., July,* 1856.

---

## NOTE ON SYRUP OF POPPIES.

Prof. Wm. Procter, Jr.:—

Dear Sir,—All the formulas given for the preparation of syrup of poppies are too tedious for the operator, unless it is when time is of no object. I therefore wish to communicate to you and to the readers of the Journal, a very simple and easy method for the preparation of this syrup, and which, when well made, will be permanent.

The best formula which I have yet seen, is that of yours, published in "Parrish's Practical Pharmacy;" but those who are familiar with displacement, can prepare it in the following manner:—

| | |
|---|---|
| Take of Poppy heads, | 9 ounces. |
| Diluted alcohol, | q. s. |
| Sugar, | 15 ounces, |
| Best French brandy, | 2 drachms. |

Deprive the poppy heads of their seeds, reduce them to a coarse powder, moisten them thoroughly with diluted alcohol, and digest for forty-eight hours, then transfer the whole to a percolator, and gradually pour upon it diluted alcohol until two pints of filtered liquor are obtained; then evaporate by means of a water bath to

bonate of iron by heat in order to give it the bright red color that has, commercially speaking, become an index of good quality. When subcarbonate of iron is made strictly by the U. S. Pharmacopœia, it approximates to an umber *brown* color, and retains two equivalents of water besides eight or ten per cent. of protocarbonate of iron, which favor its solubility in acids. —Editor]

eight fluid ounces, filter, and, having added the sugar, proceed in the manner directed for syrup. When cool, add the brandy and mix.

This affords a preparation about equal in strength to the one given by you. Yours, truly,

CHAS. W. EPTING.

*Pottsville, June 23d*, 1856.

---

## PURIFICATION OF ACETIC ETHER.

By C. RUMP.

Becker of Essen has shown in 1852 that crude acetic ether, purified in the old way by shaking with a solution of some salt, and taking the lighter liquid for the pure ether which only wanted another rectification, still contains alcohol, sometimes 30 per cent. To obtain the ether pure according to Becker, 3½ times its volume of a solution of table salt, or five times its weight of the same is necessary; he also found that of water 3½ times the weight of the ether was necessary, which however dissolved so much of the ether, that this method was rejected as impracticable. This action of water and watery solutions of salts is due to the affinity of alcohol and water, which however is not equal to that of the ether for alcohol; they must be separated by repeated washing, a purer ether will extract alcohol from the aqueous solution.

After a number of experiments the author has come to the conclusion, that the best method for the purification of acetic ether is by shaking the crude product with one quarter its weight of pure water, separating the ether and repeating the same operation three times more; the water may be saturated by chloride of sodium which separates a quantity of ether that requires washing in the same way. To the washed either 1-12th its weight of chloride of calcium is to be added, and another distillation yields the pure ether, which shaken with its volume of water, loses but eight or nine per cent of volume.

Thus treated 33lbs. of crude ether yielded 24lbs. of pure ether, and the water 5lbs. more; the process is simple and the operation requires but little time.—*Archiv d. Pharm. March* 1856. J. M. M.

## ON GOSSYPIUM HERBACEUM.

By Robert Battey, of Rome, Georgia.

*(An Inaugural Essay presented to the Philadelphia College of Pharmacy.)*

This plant, belonging to the natural order Malvaceæ, is classed by Loudon under Monadelphia polyandria. He describes it, "leaves 5-lobed, 1 glandular beneath; lobes round mucronate, involucre serrate; stem smooth." This description, although probably true to nature in the uncultivated plant, is nevertheless very faulty when applied to the great agricultural staple, cotton. A more strikingly characteristic one will be found in Carson's Pereira, edition 1854, vol. ii. at page 986. This doubtless is the species which yields the great mass of the cottons exported to Europe, and consumed in our own country in our various domestic fabrics, and which is known to the trade under the commercial technicality of Georgia Uplands. There are two other commercial varieties probably derived from different species, known as Sea Islands and Nankin. The former is perhaps the Gossypium barbadense of Loudon, and of the Nankin I find no account in any of the works to which I have referred.

As an article of trade, the Georgia Upland variety is by far the most abundant and useful. It is the staple from which all our coarser cotton fabrics are manufactured: osnaburgs, duck, sheetings, shirtings and print cloths, Canton flannels, drillings, calicos, muslins, cordage, &c., &c.

Cotton occurs in the trade of various qualities or grades, designated as "fully fair," "fair," "good midlings," and "stained." The plant, or shrub rather, which bears the cotton lint, attains a height of ten or twelve feet under favorable circumstances, usually an average of say five feet. It blossoms in June and July, and continues this flowering, as also the growth of the whole plant, until arrested by the winter frost. The color of the flower is stated in the books to be yellow; this is correct, although they are frequently to be seen in the cotton fields of any shade, from white to dark brown, passing through the various shades of yellow and red, not unfrequently variegated. The bud which precedes the flower, is termed by the planter a square, but is, in fact, triangular in shape; the calyx being three-lobed, and inclosing a tripetalous corolla. The picking season commences

about the first of September, and is continued regularly on until the plant is stript of the lint, say first of January, or even the first of February if the planter has "over cropped himself." The first picking is generally of second quality, the lower "bolls" next the earth, opening always first, are soiled with dust. And again, the plant is not sufficiently mature to produce the best quality of staple. The second time over, if the weather is favorable, is the best. "Last round" has generally been injured by the frost "stunting" the immature bolls or capsules, and it goes into the general sorting as stained cotton. The qualities intermediate between the best and worst, arise from various causes, among which are—1st. Faulty "ginning." This is done on the saw gin invented by Whitney, variously improved by more modern inventors. The saws are closely set upon a shaft, and revolve between polished iron bars. The lint is caught by the hook-shaped teeth of the saws, and being forcibly drawn through between these bars, is torn loose from its attachment to the seed. If, in this process, the motion of the gear (as the propelling machinery is termed,) be too rapid, the sudden force exerted on the centre of the fibre breaks it in two, and thus shortens the staple and renders it unfit for spinning good yarn. 2d. If the cotton be picked late in the season, as a portion of it must be, the crisped leaves often overhang the lint, and are picked off with it, and being cut up by the gin in the subsequent process, injures the product. 3d. A heavy beating rain throws up dust and fine particles of sand on the wet lint, and it thus becomes more or less stained. This latter difficulty is partly remedied in the ginning.

The color usually preferred by the dealers in cotton, is not pure white, nor is it yellow or stained, but rather a soft, delicate creamy shade, with pearly lustre. A more important point perhaps than color, is the quality of the staple, which should be long and unbroken.

It comes to market packed in square bags, weighing variously from 400 to 550lbs. They are put into this form by means of the "packing screw," a tall, rude, unwieldy and unsightly apparatus, which, strange to say, has never yet been superceded by some better and more economical arrangement. Many have been very ingeniously devised, but none offering any decided ad-

vantages over the old for general use. The bags or bales are usually about 5 by 3 by 2½ feet in dimensions, which, at the port of shipment, are compressed by powerful steam machinery into less than half their former size, for economy in freighting over the ocean. The standard bale of cotton, in estimating crops, is taken at 400lbs., so that a plantation sending to market 800 bales, weighing an average of 500lbs each, is usually said to have made a thousand bags of cotton.

The Sea Island cotton differs from the Georgia Uplands in the much greater length of its staple, and hence is often called the long staple cotton. It is also softer and more silky to the touch, and possesses a richer creamy lustre. The characters of the seed distinguish the two readily; that of the former being black, rather glossy, though not decidedly so unless rubbed, when they readily take a polish; the lint does not adhere to the seed. In the Uplands, the seed has a dirty green color in mass, arising from the short fuzzy down which adheres very strongly to the surface. When this is removed, the dark chestnut brown capsule is seen enclosing the seed. The lint here adheres to the seed, and is broken loose in the ginning, often leaving short portions attached to it.

The long staple or Sea Island, as its name indicates, was formerly cultivated only in the islands and adjacent sea coast, but it is now successfully grown throughout the interior of Florida and along the Southern borders of Georgia, Alabama, Mississippi, Louisiana and Texas. The roller gin used in preparing this variety for market, consists essentially of two cylindrical wooden rollers, revolving in opposite directions on each other, catching the lint between their adjacent surfaces and drawing it away from the seed, without danger of crushing the latter, so slightly is the lint attached.

This variety of cotton yields much less abundantly than the former, and is more difficult of cultivation and preparation for market; hence commands a price proportionably higher, sometimes even five times that of the ordinary. In consequence of its greater length of staple, it spins a very strong thread, and one which may be drawn out to a much greater degree than the shorter fibre. This property admirably fits it for the manufacture of sewing threads, and for the beautifully attenuated gossa-

mer fabrics which adorn the persons of the gentler sex. As the strong pressure of the packing screw would injure the appearance of the fibre, it is generally brought to market in round bags, much in the style of wool sacks, weighing from 275lbs. to 350lbs.

The Nankin cotton was introduced into this country early in the history of our cotton trade, and cultivated to a considerable extent for its beautiful buff or nankin color, and was highly prized by the Southern planter for his summer clothing. It commanded a high price for many years, but at length the ingenuity of the chemist and dyer produced the Nankin from the ordinary Uplands, and at prices so low as effectually to exclude the former from market. It is still, however, cultivated on a small scale, chiefly for domestic manufacture. Its price ranges from 20 to 30 cents the lb. The staple is intermediate between the Uplands and Sea Island.

Upland cotton may be stated as a fairly remunerating crop to the planter at 8 cents per pound, and the long staple at, say, 23 cents. The mass of the former would probably be classed as "good midlings." Extremes in price to the Georgia planter for this variety, say 4½ to 13 cents. In the competitions of trade, it has grown to be a custom among "buyers" to pay from 2 to 5 cents (not often the latter) over the fair market value for the first lot of cotton offered in their locality. The annual crop of our Southern States is estimated in round numbers at 3 millions of bags. The average crop to the acre at 800lb of "seed cotton," yielding from 30 to 33 per cent. of marketable lint. Average crop "to the hand" 4 to 5 bales. Extremes 2 to 10. In reckoning hands, a boy is classed as ⅔, ½ or ⅓ hand, as his age and ability may dictate. In these estimates the "force" is supposed to make also the breadstuffs, vegetables, fruits and forage consumed by man and beast. The late picked cotton yields more in weight of seed and less of lint.

This product of the cotton plant, viewed in the light of its commercial and economical importance, becomes one of deep interest to every one. It affords us a cheap and most valuable clothing material for the masses, which nothing else could replace. It gives employment to millions on millions of laborers, and a productive activity to billions of monied treasure. There is no

civilized nation upon the globe, which does not, more or less, feel its influence. It has been stated, and I doubt not truly, that this crop in its production, manufacture, and distribution, employs more capital than all the other agricultural staples of our country combined, and what is perhaps of greater moment than all this, it determines the destiny of more than four millions of human beings in our own country alone, riveting immoveably the chain which binds the slave to his task in the cotton-field. But there is another view of this subject which is more to my purpose now, viz:—its chemical characteristics, as well as the fitness of the refuse seed and root for a wider and more useful application in medicine and the arts. The lint has, within a few years past, been introduced into the officinal list of our Materia Medica, and used as an application to recent burns and scalds, and for the preparation of collodion. The other portions of the plant are as yet non-officinal. With the officinal lint I had designed having nothing to do, at least as its chemical and medical properties are concerned, but the interest which it has for me, as the staple agricultural product of my native State, has prompted me to speak thus briefly of it.

The root of the cotton plant sends down a main spindle to a depth of from 12 to 24 inches; from this branch off in all directions numerous lateral rootlets, being large and long near the surface of the soil, smaller and shorter as they descend, giving the entire root the form of an inverted cone. In color, the cortical portion is of a bright yellowish brown, the ligneous a light yellow. *Taste.*—In the dry state the first impression is very slightly sweet, otherwise very much that of the Radix Glycyrrhiza, subsequently a decided astringency, unaccompanied by either bitterness or acrimony.

With one exception, which I shall presently notice, no practical application of this root has come under my observation or within the limits of my reading. Extensive as its production is, so far from its answering any useful purpose to the planter, he considers it rather an encumbrance to the free tillage of the soil, not in his estimation answering any good end worth counting upon as a fertilizer.

The exception to which I have referred, is based upon an article from the pen of Dr. Bouchelle, of Mississippi, contributed to the

"Western Journal of Medicine and Surgery," for August, 1840, in which he states that he has been in the habit of employing a decoction of the root, made by boiling four ounces of the inner bark in a quart of water to a pint measure; of this he administers a wine-glassful every twenty minutes, in cases of protracted labor, to promote the contractions of the uterus. He considers it not inferior to ergot in such cases, and he employs it largely as an emmenagogue also. He further states that it is habitually employed by the negroes of the South for bringing on abortion, successfully, and this without injury to the general health. I may remark that no case of its use, in any form, has come to my knowledge, through the section of the South in which I reside. Indeed I feel confident that its properties in this regard, as set forth by Dr. Bouchelle, are not at all suspected among the masses, either whites or blacks, in my vicinity. The small number of abortions from any cause with us confirms this impression. Fifteen years have now elapsed since the appearance of Dr. Bouchelle's article, and yet the cotton root seems not to have gained favor with the medical profession, and indeed his experiments are scarcely remembered at all. This want of success cannot be attributed to a deficiency in supply of the raw material, at least in the South. Is it then inert and useless? or was the form in which the proposed remedy was to be exhibited so objectionable as thus to consign it to oblivion?

The seed of the cotton has commanded more attention than the root. It was announced many years ago, that the seed contained a fixed oil in large quantity, which promised to be valuable; so much I have heard reiterated over and over again from my boyhood up; but have yet to learn of any valuable use which has grown out of the discovery. The oil I have never seen. A popular notion prevails to a considerable extent with us, that it is used in the adulteration of linseed oil. This is doubtless an erroneous idea, but often serves the careless painter a good turn, in bringing the oil man between himself and his dissatisfied employer, and he thus escapes on the plea of cotton-seed oil. The seeds are esteemed a valuable stimulating manure, and are chiefly employed for this purpose. They are thrown into heaps and allowed "to heat." This process of fermentation sets very soon, if the seed be damp, and continues until the vitality of the

germ is lost. The seed is then ready for application. Corn is the crop thought to be most benefitted by them; merely a handful of the seed is dropped into each hill of corn, the grain dropped on top, putrifactive fermentation soon commences, and by the heat as well as the gases evolved, stimulates the sprouting grain. The cotton-seeds are by many highly esteemed as food for cows during the winter months. I use them habitually for this purpose. They are very fond of them, and what is a little surprising of the lint also, the latter they will eat with avidity and in large quantities when they have access to it. Cotton-seed is said to have been used, with marked beneficial results, in the treatment of intermittents. Prof. H. R. Frost, in the Charleston Medical Journal, May, 1850, states on the authority of Dr. W. R. Davis, of Monticello in that State, that these seeds were often used, and with uniformly successful results, by a planter of Newberry District, who first discovered their remedial power. He recommends a pint of the seed in a quart of water, boiled to a pint, and one fourth to be administered to the patient in bed. Notwithstanding the very high estimation in which these remedies seem to have been held by the several parties reporting on them, it would seem they are not thought worthy of general introduction by the profession at large. One reason for this seeming indifference may be found in the very large doses of crude material in the form of decoction, necessary to produce the desired effect, such treatment is not to be expected to gain favor in this age of concentrated remedies, attractive to the eye, and little as may be repulsive to the taste. Hence if it be found that the root and seed of the cotton contain principles of remedial value, and they are destined to play any conspicuous part in the treatment of disease, we must look for it in some more active and more inviting forms than have been heretofore presented.

In selecting this subject for my thesis, several inquiries suggested themselves.

1st. Does the root or seed of the cotton possess medicinal properties of any value?

2d. If so, in what proximate principles do these properties exist?

3d. In what most eligible forms shall they be exhibited?

4th. Can the root be made available in the arts for any valuable purpose?

5th. What is the nature of the oil from the seed, and to what valuable use may it be applied.

It has not been my expectation, by any means, to offer satisfactory answers to any of the queries indicated on the present occasion. The subject is one of deep interest and one of which I desire to pursue in detail, this my other engagements will not permit at present, but I have chosen to spend what hurried hours I could upon it, and offer it in this crude state, with the promise of something more definite in the future.

While absent on a brief visit to my family in the month of December, I procured some bark and fibres of the cotton root, taken after the lint had chiefly matured. The root had not been touched by frost, and was consequently in the green state. It was dried, ground to a coarse meal, macerated in diluted alcohol for 48 hours, transferred to a percolator and exhausted with the menstruum. Alcohol of 90 per cent. was then added until it passed clear. The tinctures thus procured were evaporated separately to the consistence of a soft extract, mixed together and treated with water, left behind the dark red substance marked "A" in the accompanying samples. This was treated with strong alcohol, and filtered from a dark red friable mass marked "B," which was almost entirely insoluble in water, alcohol, ether and chloroform.

The alcoholic solution, on standing exposed, deposited gradually a sediment corresponding, in all respects, so far as examined, to sample "B." This solution was evaporated to dryness and marked "C," and was then only partly soluble in alcohol.

The aqueous solution evaporated to dryness was found to contain sugar; marked "D." All these solutions had the deep red color, less marked however in the aqueous than alcoholic. Both had a marked astringency to the taste, more intense in the alcoholic. This was tested as follows:

Gelatine was precipitated.
Starch precip. light brown sol. remains.
Albumen precipitated.
Hydrochloric acid precip. beautiful light cherry.
Sul. acid precip. bright cherry insol. excess.
Nitric acid dil. precip. cherry; strong acid destroys.
Phosphoric acid precip. light reddish brown.

Boracic acid no change.
Acetic acid precip. bright cherry.
Tartaric " " " " not entirely.
Citric " " " " "
Oxalic " " " " "
Potassa precip. dark brown, soluble in excess.
Ammonia slight change of color only.
Carb. potassa precipitates partially.
Carb. soda no precipitation, very little change.
Tart. emetic no change.
Acet. lead scarlet precipitate.
Proto salt iron precip. dingy black.
Per salt iron precip. brownish red.
Basic acet. iron scarlet ?
Yellow pruss. potash precip. red, partial.
Corrosive sublimate precip. red.
Sul. cinchonia " insoluble in acetic acid.
Lime water " dirty greenish.
Chloride of calcium " without change of color.
Proto salt tin " dark red.
Sul. copper " brownish red.
Basic chlor. iron " " black.
Litmus sol. is reddened ? not very decisive.
Per acet. iron, cold no change; hot salmon precipitate.

The tincture diluted to any extent with water retained its transparency. This diluted solution was used in the tests.

These tests I do not of course attach any particular importance to. I give them simply for what they are worth. They will serve me a purpose in feeling my way along.

The same tests were applied to a solution similarly obtained from catechu, with results agreeing for the most part, but widely differing in some points.

I submit specimens of dyes obtained from the cotton root, and also from catechu, for comparison. The samples are so roughly executed, I forbear any comment on them or the processes by which they were obtained, except only to remark that they are very permanent, most of them having been well scrubbed with soap.

The crude material was subsequently treated with water acidu-

lated by HCl; solution precipitated by ammonia; precip. was redissolved and reprecipitated. An accident contaminated the result with phosphate of lime, and the presence of other engagements precludes the idea of a further examination of the mixture.

The results of my labor, a portion only here stated, are meagre and unsatisfactory; they are sufficient, however, to inspire the hope that my future investigations may develope facts interesting, and I hope also useful in their character, from the refuse matters of the Gossypium Herbaceum.

---

## ON THE PREPARATION OF DEUTOXIDE OF LEAD.

By Ferd. Feist Mayer.

To the Editor of the American Journal of Pharmacy:

Dear Sir,—The process given by Prof. Woehler, and mentioned in the last number of your Journal, produces a perfectly pure deutoxide of lead, and is certainly a very expeditious method for those to which the disengagement of gaseous chlorine is not combined with any inconveniences.

As this is, however, very often the case, you will allow me to mention a different way which I have followed in preparing larger quantities of the deutoxide, and which yields as much and at least as cheap a product as Woehler's.

In the latter, the action of chlorine on the protoxide of lead is mediated by the formation of hypochlorite of soda and chloride of sodium.

$$PbO\ \overline{A} + NaO\ CO_2\ (+Cl) = PbO\ CO_2 + NaO\ \overline{A}\ (+Cl) =$$
$$PbO\ CO_2 + \tfrac{1}{2}\ NaO\ ClO + \tfrac{1}{2}\ NaCl\ (+\overline{A}) = PbO_2 + NaCl + CO_2 + \overline{A}.$$

An alkaline solution of a hypochlorite, as, for instance, that formed by decomposing chloride of lime with sulphate of soda and an excess of carbonate of soda, or the officinal Labarraque's solution, will therefore act precisely in the same manner on any compound of oxide of lead. Of the latter, even for analytical purposes, the brown acetate and the sulphate of lead furnish the same products as the more costly salts.

I decompose the chloride of lime as given in the U. S. Pharmacopœia under liquor sodæ chlorinatæ, and pour the decanted

or filtered solution into that of the lead salt, or to the sulphate diffused in water, and heated nearly to boiling, as long as a precipitate forms, or the intensity of color increases. After the brown oxide has settled, the supernatant liquid is drawn off and the precipitate repeatedly washed.

The presence of free alkali or of carbonate or acetate of soda is essential, since they serve to decompose or dissolve any chloride of lead forming.

In regard to Overbeck's method of preparing the deutoxide, it must be carried in mind, that, although the ferrid-cyanide of potassium serves to oxidize the protoxide of lead in an alkaline liquid, as soon as the free alkali present is taken up by the ferro-cyanide or converted into carbonate from the air, an inverse reaction takes place. For

$$KO+PbO+K_3\,Fe_2\,Cy_6+Aq=PbO_2+2\,(K_2\,Fe\,Cy_3)+Aq;$$

but $PbO_2+2\,(K_2\,Fe\,Cy_3)+Aq=K_3\,Fe_2\,Cy_6+Ko+PbO+Aq$—*i. e.*, deutoxide of lead in contact with ferro-cyanide of potassium forms ferrid-cyanide of potassium, hydrated oxide, and some carbonate of lead with free or carbonate of potassa in solution, the carbonic acid being taken up from the atmosphere.

At the same time it may be remarked, that this latter reaction forms the very best means of preparing a pure red cyanuret of potassium and iron on a small scale.

Yours, most obedient, FERD. FEIST MAYER.

Philadelphia, August, 1856.

---

## A FEW HINTS RELATIVE TO THE COLLECTION OF SOME INDIGENOUS DRUGS.

By THE EDITOR.

It is a matter of some importance to the thorough pharmaceutist to keep in mind the proper time of gathering plants and barks, roots, leaves and other parts of plants, in reference to laying up a store for future use and for the manufacture of quantities of preparations requiring them to be used at the period of their greatest medicinal power.

*Wild Cherry Bark.*—According to the results of Mr. Perot, (see vol. xxiv. page 109, of this Journal,) the proper period of col-

lecting wild cherry bark is in the fall, September or October, as then it contains a larger proportion of amygdalin, and consequently yields more hydrocyanic acid and volatile oil than in the spring or summer.

*American Senna.*—According to the late Dr. R. E. Griffith, (Medical Botany, p. 261,) American senna leaves should be collected when the fruit is ripe or nearly ripe, which is in September.

*Dandelion Root.*—Roots generally, as is well known to many, should be collected in the fall months, and before frost sets in. This is especially true of taraxacum, which in October has its juices well stored with the bitter principle, the presence of which is usually considered an index of medicinal power, although we believe physicians have yet to prove on what constituent of the plant that power depends.

*Pith of Sassafras.*—An experienced collector of medicinal plants informs us, that pith of sassafras should not be collected until *after* the 15th of October, as when removed before that time it frequently assumes a brown hue, probably from the presence of juices subsequently removed by absorption, as the period of suspended vegetation approaches.

*Diospyros—Unripe Persimmons.*—Formerly the bark of the persimmon tree was the part made officinal, but in the Pharmacopœia of 1850, the unripe fruit was substituted, which is now the proper officinal substance to be dispensed under the name "Diospyros." The fruit should be collected when it has attained its full size, and on the point of changing color, but before the conversion of tannin into sugar has commenced, a change rapidly promoted by frost. In September is the time for the collection of this fruit. When not used fresh, it should be sliced and dried in a warm situation with free circulation of air.

*Dulcamara.*—The terminal twigs of bitter sweet should be collected in October, or after the fall of the leaves, and, for convenience of division by the mill or pestle, should be cut in short transverse slices, not over half an inch in length; a treatment which also favors their dessication.

*Ulmus.*—Slippery elm bark, as found in the market, varies much in appearance and quality; sometimes its color is uniform throughout, fibrous, and full of mucilage, with but little astringency. At other times its fibrous character is wanting, and the

bark breaks transversely without difficulty, is much less mucilaginous, and consists chiefly of cellular structure. Again, it is met with much discolored and with portions of the outer bark adhering. Now it is highly probable that the season of collection has a marked influence on the structure and medicinal value of the bark; yet we *know* so little, positively, of the times and circumstances of collecting the varieties of commerce, that it would be, perhaps, presumption to hazzard an opinion, and therefore suggest that some pharmaceutist, who has the opportunity by location, will investigate the influence of season on the character of the inner bark of Ulmus Fulva.

---

## ON LIQUIDAMBAR STYRACIFLUA.

By Charles W. Wright, M. D.,

Professor of Chemistry in the Kentucky School of Medicine.

Liquidambar Styraciflua, commonly called *sweet-gum*, is indigenous to nearly every part of the United States, and constitutes one of our largest forest trees. When an incision is is made through the bark of this tree, a resinous juice exudes, which possesses an agreeable balsamic odor. When this substance first exudes, it is of the consistence of turpentine, and possesses a stronger smell in that condition than it does after it has become resinified. Contrary to the statements made by Wood and Bache, in their *Dispensatory*, this tree furnishes a considerable quantity of resin in the Middle States, particularly in the States of Ohio, Indiana, and Kentucky, bordering on the Ohio River. It is annually collected in those States, and sold under the name of *gum-wax*. It is a much more agreeable masticatory than the spruce-gum, and is chewed in the West by nearly all classes. By proper incisions, one tree will yield annually about three pounds of the resin.

The chemical composition of the specimens collected in this latitude correspond with that given by M. Bonastre, of specimens gathered elsewhere, viz: benzoic acid, a volatile oil, a semi-concrete substance separated by distillation and ether, an oleo-resin, a principle insoluble in water and cold alcohol, termed *styracine*. The bark of the tree contains tannic and gallic acids, to which its astringency is due.

What I wish more particularly to call attention to is the employment of a syrup of the bark of this tree, in diarrhœa and dysentery, and more especially the diarrhœa which is so prevalent among children during the summer months in the Middle States, and which frequently terminates in cholera infantum.

The best formula for the preparation of this syrup is that given in the *United States Pharmacopœia*, for the preparation of the syrup of wild-cherry bark, of which the following is a copy, the sweet-gum bark being substituted for the wild-cherry bark.

"Take of sweet-gum bark, in coarse powder, *five ounces;* sugar (refined) *two pounds;* water *a sufficient quantity.* Moisten the bark thoroughly with water, let it stand for twenty-four hours in a close vessel, then transfer it to a percolator, and pour water upon it gradually until a pint of filtered liquor is obtained. To this add the sugar in a bottle, and agitate occasionally until it is dissolved."

The dose of this syrup for an adult is about one fluidounce, to be given at every operation, as long as the operations continue to recur too frequently.

One advantage which this medicine possesses over most astringent preparations is that of having an exceedingly pleasant taste, and of being retained by an irritable stomach when almost every other substance is rejected. Children never object to it on the score of bad taste. The resinous and volatile bodies which it contains, no doubt enhances its value. My brother, Dr. J. F. Wright, of Columbus, Indiana, has employed this preparation for the past three years in a great number of cases, with the most satisfactory results. He prefers it to any other article where there is an indication for astringent medication in the class of diseases before referred to. In the bowel complaints of children it has a decided advantage over all preparations containing opium, and I am always pleased with the happy results which follow its employment in that class of patients.—*American Journal of the Medical Sciences, July*, 1856.

## ON PROTOSULPHATE OF NICKEL.

By C. Marignac.

According to Marignac, the protosulphate of nickel in quadratic crystals, to which the same amount of water has hitherto been ascribed as to the rhombic salt NiO, $SO^3$+7HO, only contains 6 equivs. of water. From a solution of pure protosulphate of nickel he obtained, at 59° to 68° F., the rhombic crystals, isomorphous with sulphate of zinc and sulphate of magnesia; at 86° to 104° F. quadratic, and at 122° to 158° F. monoclinometric crystals. These crystals showed the following composition:

| Rhombic crystals. | | | | Quadratic crystals. | | | |
|---|---|---|---|---|---|---|---|
| | Calculated. | Found. | | | Calculated. | Found. | |
| NiO | 26·71 | .. | 26·38 | NiO | 28·53 | 28·32 | |
| $SO^3$ | 28·46 | .. | 28·47 | $SO^3$ | 30 41 | 30·42 | |
| 7HO | 44·83 | 44·62 | 45·15 | 6HO | 41·06 | 41·26 | 41·59 |

| Monoclinometric crystals. | | | | | |
|---|---|---|---|---|---|
| | Calculated. | Found. | | | |
| NiO | 28·53 | 27·79 | | | |
| $SO^3$ | 30·41 | 29·82 | | | |
| 6HO | 41·06 | 42·39 | 41·55 | 41·58 | 41·08 |

Marignac remarks that even Mitscherlich found 30·14 and 29·88 per cent. of sulphuric acid in the quadratic salt. When the rhombic crystals are converted by exposure to the light of the sun into aggregations of quadratic crystals, a loss of water takes place, which Marignac determines at 6·87 per cent.; the conversion of NiO, $SO^3$+7HO into NiO, $SO^3$+6HO, requires a loss of weight of 6·40 per cent. The monoclinometric crystals remain transparent above 104° F.; at ordinary temperatures they gradually become opake without loss of weight, and are probably converted into aggregations of quadratic crystals.

Dimorphism was therefore ascertained to occur in NiO,$SO^3$ +6HO, but not in NiO, $SO^3$+7HO.

From solutions of sulphate of magnesia at about 158°F., of sulphate of zinc at 122° to 131° F., and of protosulphate of cobalt at 104° to 122° F., the author obtained crystals of the composition RO, $SO^3$+6HO, isomorphous with the monoclinometric protosulphate of nickel, NiO, $SO^3$+6HO.—*Chem. Gaz.*, July 1, 1856, from Liebig's *Annalen*, March, 1856.

## A MANUFACTORY OF ULTRAMARINE AT NUREMBERG.

The manufactory belonging to Messrs. Zeltner & Heyne has acquired a European reputation, and sends its produce to all parts of the globe. Its exterior aspect is somewhat imposing, the whole being surrounded by a wall, and one of the buildings looks rather like a fortress, the entire space occupying an area of seven Bavarian acres (*Morgen*). The central building consists of a polygon of twenty-four sides, with ninety-six furnaces, arranged in twelve compartments with as many high chimneys. Thence issue twelve branches of rails to all parts of the manufactory, being provided at the intersecting points with turning platforms. From the upper stories similar rails of wood are laid; the iron rails being 4500 feet long, the wooden ones a trifle less. If we enter the polygon, which has a diameter of 136 feet, and is surrounded by buildings 300 feet long, and two stories high,—the dim of twilight gives the idea of being in the pit of a mine. All these buildings are vaulted and bomb-proof. The departments of this manufactory are manifold. In the middle is a building for mechanical contrivances, with two steam engines; to the east the above polygon; towards the west a high-pressure engine, with a mill and a washing apparatus. The mills have twenty-eight troughs, and are mostly of cast iron; of the two stores one is 300 feet long, and this alone can hold 3000 to 4000 cwts. of ultramarine. A swinging rail transfers the colors from one end of the building to the other. Covered passages connect the single buildings, and there are seven large roads and six courts, presenting everywhere a fine perspective. Towards the west is a long row of drying-houses, in which a constant tropical heat is to be maintained, so that winter loses it power in all the vicinity. The merit of the discovery of artificial ultramarine belongs to Professor Gmelin, who died in scanty circumstances. This manufactory arose in 1839, and the proprietors preserve yet the weather-boarded shed in which they began business. The manufactory employs 200 workmen, of whom 180 are married. They have established a sick fund, and a pension fund for widows, orphans, and invalids, as well as a singing chorus. The best blue artificial ultramarine has to pass eighty different processes until it is ready for use, and is now applied to the coloring of cotton and wool-stuffs, tapestry, paper, sealing-wax, &c., besides its purely artistic use.—*Jour. Frank. Inst., from London Builder.*

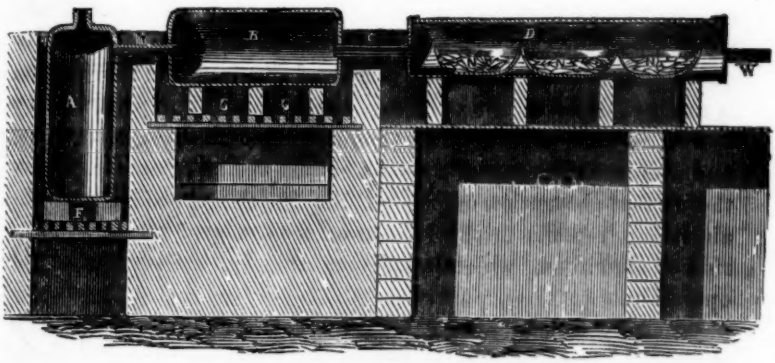
## PREPARATION OF ALUMINIUM, SODIUM, CHLORIDE OF ALUMINIUM, ETC.

Mr. Deville has just published a detailed account of the experiments with which he has been engaged for some time, with reference to the production of aluminium, in such a state, and at such a cost, as to be practically applicable for various purposes in the arts.

The method that he adopted is essentially the same as that by which Mr. Wöhler obtained this metal—the decomposition of chloride of aluminium by means of an alkaline metal. Sodium was chosen as the decomposing agent, because it is more easily obtained than potassium.

The apparatus used is represented by fig. 1. It consists of three cylinders A, B, D, connected by tubes Y, C, and heated by furnaces F, G.

Fig. 1.




The chloride of aluminium is introduced into the cylinder A; the sodium is placed in trays, holding about ten pounds each, within the cast iron cylinder D. The intermediate cylinder, B, contains about a hundred weight of scrap iron, which serves to separate iron from the vapor of chloride of aluminium, by converting the perchloride of iron into the much less volatile protochloride; it also separates hydrochloric acid and chloride of sulphur.

While the operation is in progress, the tube C is kept at a temperature of 400° to 572° F., and the cylinder D is heated so as to be barely red at the under surface; the reaction between the chloride of aluminium and sodium is attended with so great an evolution of heat that it is sometimes necessary to remove the fire entirely.

Very soon after the reaction has commenced, the chloride of sodium combines with the excess of chloride of aluminium, forming a double salt, which is sufficiently volatile to be carried to the adjoining tray, where the aluminium is eliminated by means of the sodium. The reaction does not commence in one tray, until it has ceased in that which precedes it, and it is at an end when on removing the cover (W) of the cylinder, the last tray is found to contain, in the place of the sodium, a black mass, covered with a colorless liquid which is the double chloride of aluminium and sodium. The trays are then withdrawn, and replaced by a fresh charge of sodium.

When the contents of the trays are cold they are transferred to crucibles of cast iron or clay, and heated until completely melted, and the double chloride begins to volatilize. Most frequently the reaction between chloride of aluminium and the sodium is not completed in the cylinder, the sodium being protected by a crust of chloride of sodium; but a double chloride of aluminium and sodium at the top of the trays is always sufficient to ensure the perfect absorption of the sodium in the crucible, and the aluminium remains finally in contact with a large excess of chloride of aluminium, which is indispensable for the success of the operation.

When the crucibles are cold, the layer of chloride of sodium is is removed from the top, and from the lower part the globules of metal are separated by washing with water; but, unfortunately, the chloride of aluminium is dissolved, and exercises a very destructive action upon the metal, so that the globules obtained are not larger than a pin's head. These are collected, dried, put into a crucible, melted, and run into an ingot.

It is necessary to take especial care in removing from the sodium every particle of carbon which is sometimes mixed with it when badly prepared or insufficiently purified, for otherwise considerable quantities of metallic cyanides or cyanates are formed,

which disengage ammonia when brought in contact with water, and cause a further destruction of aluminium. It is also necessary to avoid melting the aluminium while it contains sodium, in which case it takes fire. It is always better to melt it together with some of the double chloride of aluminium and sodium.

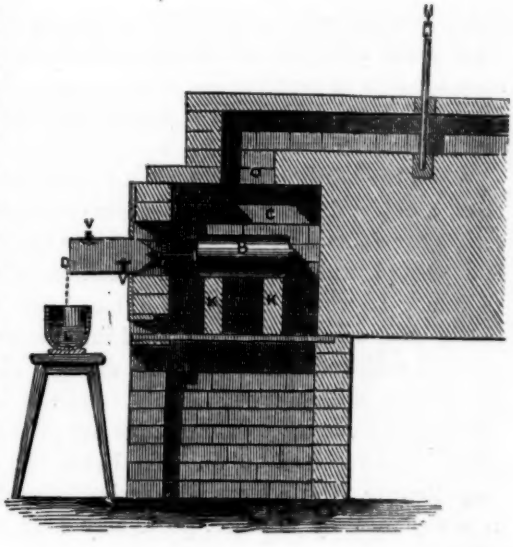
The sodium was obtained by heating a mixture of carbonate of soda and carbon in an iron vessel. In operating upon the large scale coal is used, and the proportions of the materials that furnished the best result were—

| | |
|---|---|
| Carbonate of soda (dry) . . . . | 30 |
| Coal . . . . . | 13 |
| Chalk . . . . . | 5 |

The characters requisite in this mixture are that it should not melt at the temperature at which sodium is liberated, and that it should acquire a pasty consistence so as to remain in contact with the sides of the vessel in which it is heated. The high latent heat of carbonic oxide and of gaseous sodium prevents the iron vessel from being melted.

These substances are dried, powdered, and sifted; then mixed and sifted again, so as to be intimately mixed. The mixture should then be calcined. By this means its volume is considerably reduced, and when the calcination can be effected by the waste heat of a furnace, considerable advantage is gained.

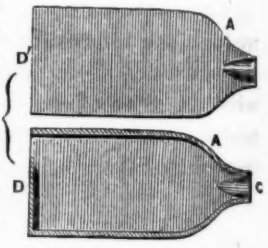
Fig. 2.



The apparatus used for the preparation of sodium is represented by fig. 2. The fireplace, CC, of the furnace, shown in action, is lined with firebricks; the bars, G, are moveable, and the flue should be furnished with a well fitting damper. In the breast of the furnace there is a square opening, P, closed by a plate of cast iron, with a hole through which the tube, T, may project.

A mercury bottle, furnished with an iron tube about three inches long, serves as the distillate or vessel. It is supported upon two firebricks, K, about four inches high, and hollowed at the top so as to fit the side of the bottle.

Fig. 3.




The receiver (fig. 3) in which the sodium is condensed is made of two pieces of sheet iron about one tenth of an inch thick, AA. One of these pieces is flat, except at the end, C, where it is hammered so as to form a semi-cylindrical hollow. The other piece is turned up at the sides so that, when fitted to the plate, A, there is a space of about one fifth of an inch wide and a hollow, corresponding to that in the other plate, is hammered at the end, so that together they will form a collar to receive the conical end of the tube T. The edges are filed, so as to fit close, and are kept in their place by two binding screws (VV, fig. 2.)

When the bottle containing the mixture is placed in the furnace, and the fire made up, a copious evolution of gas commences; and, after about half an hour, a white vapor of carbonate of soda is deposited, which would seem to indicate that the gas contained sodium. However, the receiver must not be attached to the bottle until a cold iron rod passed into the tube, T, is found to be covered with sodium. When the draught of the furnace is good, the sodium is disengaged rapidly, and the receiver becomes so hot that the condensed metal flows out of the open extremity, D, where it is received in an iron basin, L, containing coal tar naphtha. If, after a time, the receiver should become stopped up, it is replaced by another, previously heated to about 400° or 500° F.

When this operation is well conducted, the sodium obtained is quite pure, and is not accompanied by those carbonaceous substances that are so troublesome in the preparation of potassium.

The operation should be conducted so rapidly that a charge of five pounds of the mixture may be worked off within about two hours.

The temperature requisite for the reduction of carbonate of soda by means of carbon is not so high as has hitherto been supposed; and, according to the opinion of Mr. Rivot, is not greater than that of the retorts in the centre of the zinc furnaces at the Vieille-Montagne.

From the ease with which the operation is conducted, it might be supposed that by increasing the dimensions of all parts of the apparatus used, much larger quantities of sodium may be obtained. However, Mr. Deville has found that there are practical objections to this course; and, after many unsuccessful attempts to work large receivers, he has found that it is preferable to use, with a reduction apparatus five times as large as the mercury bottle, receivers of the same dimensions as in that case.

In operating with large reduction vessels, the calcination of the mixture becomes more advantageous, if not indispensable. When the operation is made continuous, the mixture may be calcined as it is required, and introduced into the reduction vessel red hot.

The vessels used for the continuous operation are drawn iron tubes, four feet long, six inches internal diameter, and about $\frac{1}{2}$ inch thick. One end is closed by a $\frac{3}{4}$ inch plate of iron, with a hole near one side, into which is screwed the discharge tube that fits into the receiver. The other end of the cylinder is closed by a moveable iron plug, *O*, with a handle; it is at this end that the mixture is introduced.

These tubes must be covered with a refractory lute, and an exterior envelope of baked clay, so as to be entirely protected from the direct action of the fire.

The furnace in which the operation was conducted was an ordinary reverberatory furnace, in which the fireplace was divided into two parts by a small wall upon which the cylinders rested in the middle, while their ends were level with the outer walls of the furnace. The fuel was introduced through two lateral openings

kept closed by the fuel upon a shelf outside the furnace. These openings are at such a height above the bars of the furnace, that there would be a space of a foot between the fuel and the tubes. The fuel used was a mixture of equal parts coke and coal.

Upon the hearth of the furnace, the mixture for the preparation of sodium may be calcined in crucibles: and, when the furnace is worked continuously, the temperature becomes sufficiently high for working some reduction cylinders upon the hearth.

Mr. Deville did not find the furnace which he used very well adapted for the production of potassium, and considers that it would be better if constructed after the manner of a puddling furnace described by M. Dumas. He is of opinion that there is no question as to the practicability of the production of sodium by a continuous operation, if the furnace is constructed in a suitable manner.

The chloride of aluminium was prepared by the method recommended by Gay Lusac and Thenard. Alumina, quite free from iron, was mixed with 40 per cent. carbon, and a small quantity of coal, made into a paste, and decomposed at a red heat. The compact mass was broken into fragments, and introduced into an earthen retort. This was placed in a furnace, and heated in redness, while a stream of dry chlorine was passed through the contents. At first a considerable amount of water was evolved from the aluminous carbon, which is very hygroscopic. When the chloride of aluminium began to appear, an earthen funnel was fitted to the neck of the retort by means of asbestos and clay, and a bell-shaped vessel fitted in the same manner to the rim of the funnel. The chloride of aluminium condenses in this receiver, and, however rapid the stream of chlorine may be during the chief part of the operation, it is so completely absorbed by the aluminous carbon that the carbonic oxide which escapes does not give any indication of chlorine. However, it contains a little chloride of silicum, arising from the action of the chlorine and carbon upon the material of the retort; also, some aluminium, and, perhaps, some chlorocarbonic acid. When the receiver is full of chloride of aluminium, it is removed, and replaced by another, and so on till the operation is finished.

The amount of chloride of aluminium obtained from 10 pounds of alumina was rather more than 20 pounds. The carbonaceous

residue in the retort contained some alumina, a considerable amount of alkaline chlorides, and of the double chloride of aluminium and potassium. The residue was washed, mixed with a fresh quantity of alumina, and subjected to the same treatment.

In working the process upon a large scale, pitch was used as the carbonaceous substance; instead of the clay retort, an ordinary gas retort, and, instead of the bell vessel, a small brick chamber, covered with glazed earthenware.

The ammoniacal alum is calcined upon the hearth of the reverberatory furnace, in which the sodium is prepared. After having been heated to redness, it is powdered and mixed with coal tar. The paste is introduced into crucibles carefully covered, and placed in the reverberatory furnace. When the evolution of vapor ceases, the crucibles are removed, and, when it is possible, the aluminous carbon is used while hot.

The stream of chlorine should be so adjusted as to avoid loss either by escaping from the joints of the apparatus or by being carried up the chimney.

Before commencing the operation, every part of the apparatus should be rendered perfectly dry by heating it.

With regard to the utilization of aluminium in the arts, Mr. Deville considers that the necessary condition is its production at a cost considerably less than that of silver. Owing to the difference in density, if aluminium and silver were of the same value, aluminium would be only one-fourth as dear as an equal volume of silver; and, for equal masses, the rigidity of aluminium is much greater than that of silver.

The materials with which aluminium is produced, even by the methods hitherto employed, are all obtainable at a small cost. Thus, to produce about half a hundred-weight of aluminium, there would be required

| | | | |
|---|---|---|---|
| Chlorine | 237 pounds, costing | . . | £2 14 0 |
| Alumina | 114 " " | . . | 0 13 0 |
| Carbonate of Soda | 350 " " | . . | 2 13 0 |
| | | | £5 0 0 |

Which would render the cost of the materials for producing a pound of aluminium about two shillings.

With regard to the actual cost of the production of aluminium

in these experiments, Mr. Deville states that he is unable to speak decisively; and that the means of working at his disposal were so defective that the experiments made could not furnish an exact indication with regard to this particular.

However, he states that he was able to produce sodium at a cost of three shillings and sixpence per pound, including only the cost of materials, labor, fuel, and retorts. The quantity of sodium made by Mr. Deville at the Javel Works was from 330 to 440 pounds.

The cost of the chloride of aluminium was about one-and-sixpence a pound. Alumina was prepared from ammoniacal alum, and cost as much as two shillings a pound. The quantity of chloride of aluminium made was from 1100 to 1320 pounds. *London Pharm. Journ. July*, 1856, *from Annal. de Chem.*

---

## REPORT ON THE HISTORY OF THE MANUFACTURE OF ARTIFICIAL SODA.

(From correspondence of M. Jerome Nickles, Paris 1856.)

The question of priority as to the process of manufacturing artificial soda has just been the subject of thorough investigation by the Academy of Sciences. This work was called forth by the Minister of Public Instruction at the request of the children of Leblanc, author of the process which bears his name. Another claim, that of the children of Dizé, collaborator of Leblanc, being presented at the same time, the Section of Chemistry in the Academy of Sciences was obliged to proceed to a historical and bibliographical research which has resulted in a complete elucidation by M. Dumas of this important point in the history of Science.

The discovèry of the process which derives soda from marine salt was made by Leblanc, who was also the first to give it a trial. It was not till afterward that he associated himself with Dizé, then chemical assistant at the College of France.

Nicholas Leblanc was born in 1743. Toward 1780 he was attached as surgeon to the household of the Duke of Orleans. He commenced in 1785 his communications upon crystallization which gave him a distinguished rank among the chemists of the time. His first researches upon methods of obtaining soda, economically, date from 1784. This problem had already been

broached, and different processes had been proposed for making soda from marine salt either by means of lime, or by means of the oxyd of lead, but without industrial results.

In 1777, Father Malherbe, a Benedictine, pointed out a process of converting marine salt first into sulphate of soda which he afterwards decomposed by means of charcoal and iron; a process which has quite lately been put in practice by Mr. E. Kopp, as has been already mentioned in this Journal.*

In 1789, De la Métherie proposed to convert marine salt into sulphate of soda, and to reduce this sulphate by carbon. This reduction would only have given sulphuret of sodium. Leblanc was aware of this, and according to Dizé, trials were made by himself and Leblanc to decompose this sulphuret by means of carbonic acid. This process, taken up by Pelletan in 1827, became the basis for establishing a manufactory in Paris; but the enterprise was not successful, and up to this time the method is not employed.

These processes were brought forward in consequence of competition for a prize offered by the old Academy of Sciences to the best work on the fabrication of soda from marine salt. The object was to protect the arts of bleaching, glass-making and soap-making against the evil effects of a rise in the price of pearlashes produced by the Revolutionary War in the United States, and also a rise in the native sodas of Spain, and the scarcity of beds of native natron. The prize was not awarded. The production of artificial soda, like so many other inventions, was to be accomplished only after obstinate trials, the theory of which was not to precede the results. It was not foreseen that in calcining the sulphate of soda with chalk and charcoal, an insoluble oxysulphuret would be obtained containing all the sulphur, and capable of yielding to water all the carbonate of soda contained in the product.

This is the discovery of Leblanc. It belongs entirely to him as M. Dumas has established by means of written documents of incontestable authenticity, from which it appears that on the 12th February, 1790, there was formed before a notary a company for carrying out the invention, a company composed of M. Leblanc, Dizé, and as loaner of the funds, the Duke of Orleans.

* Corr. of J. Nickles, Nov. 1, 1855.

To the fabrication of artificial soda, the making of sal ammoniac, and of white lead were added, processes of which Dizé was the author.

The Company was established at St. Denis near Paris, in a factory called *Franciade*, and the manufacture commenced but without much success. The events of the Revolution soon caused the sequestration of the property of the Duke of Orleans and consequently that of the soda factory in which he was the capitalist.

At the same time, upon the proposition of a member of the national convention, Citizen Carny, possessor of a process for the extraction of soda, an appeal was made to all Frenchmen to make within three months a surrender of their private interests, and to deposit upon the altar of their country the processes which would allow the manufacture of soda from a product drawn from French soil and which would thus relieve the country from the tax paid abroad.

Twelve processes were sent to the Committee of Public Safety, that of Leblanc among them. It was recognized as the best, and the Convention ordered the publication of his *brevet d'invention*, taken in 1791, but acknowledging his rights to a fair indemnity which the misfortunes of the time did not allow to be paid. The hour of reparation has at last arrived. The section of Chemistry in the Academy has decided as follows :

"1. The important discovery of the process by which soda is extracted from marine salt belongs wholly to Leblanc.

"2. Dizé made researches in common with Leblanc only for the purpose of determining the best proportions of the materials to be employed in the manufacture of soda, and for establishing the factory at St. Denis.

"3. If then it is proposed to render just homage to the author of the discovery, it is due to the memory of Leblanc, and to his family should the testimonial be addressed."

Leblanc was the type of the inventor; full of self denial, perseverance, confidence. His correspondence shows that he left no step untried, that might secure the success of his work. His savings, the fruit of labors undertaken from day to day, were all consecrated to this grand object; and when reduced to extremities, he exhausted every resource.

At several times the Government sent him money, to encourage his researches, and on the 19 Fructidor an II. (1793) he obtained 4000 livres from the Committee of Public Safety to meet the advances he had made in reference to the project of which he was the inventor. Leblanc was a man both of imagination and knowledge. The most distinguished men of his times professed for him a warm sympathy. He took part in all those liberal associations where friends of science resorted. The government charged him with various scientific missions. He published various researches upon nickel, alum, sulphate of magnesia, the production and extraction of saltpetre, the chemical preparation of manures, &c., but he never realized the dream of his life. In despair, he destroyed himself on the 15th of January, 1806. He left two sons, one of whom, a professor in the Conservatoire of Arts and Trades, has acquired a high reputation in the industrial world by his publications and the progress which he has made in the invention of machines.—*American Journal of Science and Arts.*

---

## ON THE COMPOSITION OF THE WATER OF THE DELAWARE RIVER.

By Henry Wurtz, New Jersey State Chemist, etc.

The water of the Delaware which was submitted to analysis, was collected from the river on the 11th day of September last, at a spot opposite the pump-house of the Water Works, and immediately over the grating through which the water is drawn to supply the reservoir. A specimen was also obtained upon the same day, of the water in the reservoir, for the purpose of comparing the proportion of foreign ingredients in the reservoir water, with that in the river water. The spring water analysed was obtained some days later, from one of the tanks from which the city was formerly supplied, in the rear of the residence of Mr. Closson.

The proportion of solid matter found in the several waters was as follows:

| | Grains. |
|---|---|
| In one gallon of Delaware water, . . . . . | 3.5346 |
| In one gallon of the reservoir water, . . . . . | 3.8555 |
| In one gallon of the spring water, . . . . . | 3.6077 |

For convenience of comparison, I will here quote the results of Professor B. Silliman, Jr., obtained some years ago with the Croton and Schuylkill waters.

Solid matter found by Prof. Silliman:

| | Grains. |
|---|---|
| In one gallon of Croton water, . . . . . | 10.93 |
| In one gallon of Schuylkill water, . . . . . | 5.50 |

The most remarkable thing about these results is that notwithstanding the quantity of sand, mud, and other sediment which is suspended in the river water, so much as to injure the pumps, and which must be in great measure deposited and separated from the water in the reservoir, the latter, nevertheless, actually contains more solid matter than the river water itself. This can only be accounted for by the favorable conditions presented in the reservoir for the growth of minute animals and plants, whose remains add of course to the weight of the solid residue obtained on evaporation. My pupil, Mr. Howland Bill, has at my request submitted the water in the reservoir, and the deposit formed at the bottom, to a microscopic examination, and reports to me that he finds in the water several varieties of animalcules and lichens or minute plants, and that the sediment especially is almost wholly composed of forests of minute plants through which roam herds of such animals as *Volvox globator*, or "globejelly," *Vibrio anser*, or "goose animalcule," and several species of *Baccillaria* and *Navicula*. On the surface of the water he found a slight green scum, which when magnified resolved itself into collections of the *Cercaria mutabilis*, an animal production characteristic of stagnant water. Numerous large green water weeds may also be seen floating in the reservoir.

Recurring to the results given above, it may also be remarked that the river water is really somewhat less charged with foreign ingredients than that of the springs, although the latter is so much more pleasant to persons possessing delicate organs of taste. This probably arises from the fact that the principal mineral ingredient in spring water, as shown by analysis, is *chlorid of sodium* or common salt, while the river water is principally contaminated with carbonates of lime, magnesia, potash, etc., which give water a bitter taste.

The analysis will be found below in a complete form and ar-

ranged so as to admit of a comparison between the composition of the river and the springs.

| | RIVER. | SPRINGS. |
|---|---|---|
| | Grains in one gallon of 58,372 grains. | |
| Whole solid matter found, . . . | 3.534581 | 3.607750 |
| Carbonate of lime, . . . . | 1.300000 | ——— |
| Carbonate of magnesia, . . . | .889972 | ——— |
| Carbonate of potash, . . . | .172471 | ——— |
| Chlorid of sodium, . . . | .106834 | 1.021225 |
| Chlorid of potassium, . . . | .012190 | ——— |
| Sulphate of lime, . . . | .185847 | .009233 |
| Phosphate of lime, . . . | .142338 | .144659 |
| Silica, . . . . . | .497587 | .755894 |
| Sesquioxyd of iron, with trace of Alumina, | .027453 | .126778 |
| In combination with the silica and organic matter, Lime, | ——— | .277662 |
| In combination with the silica and organic matter, Magnesia, | ——— | .355620 |
| In combination with the silica and organic matter, Potash, | ——— | .493059 |
| In combination with the silica and organic matter, Soda, | ——— | .173518 |
| Oxyd of manganese, . . . | *trace.* | ——— |
| Carbonic acid, . . . . | ——— | *trace.* |
| Organic matter containing ammonia . | .634852 | .558342 |
| Specific gravity, . . . . | 1.00071 | .99972 |

The specific gravity of the Reservoir water was 1.00064.

On comparison of this analysis of the waters of the Delaware with other analyses of river waters, the fact is rendered apparent that few rivers exist whose waters are so free from impurity. All causes of complaint which have arisen are due to the improper mode of storing the water for use. Open reservoirs, in which the water is kept standing for several days to stagnate in the heat of the sun, are perfect hotbeds for the growth of animal and vegetable life. Finding every necessary requisite to their germination, light, heat, and an unlimited supply of fertilizing mineral substances, phosphates, sulphates, carbonates and silicates of lime, potash, ammonia, etc., infinite numbers of minute seeds spring forth into growing plants, which in their turn furnish nourishment to innumerable swarms of living animals engendered from their embryos preëxistent in the water. The breeding of these microscopic creatures, under favorable circumstances, is so rapid that in a very few hours the water will become alive with them.—*Ibid.*

## PURIFICATION OF WATER SUPPLIED TO TOWNS, ETC.

At a recent meeting of the Society of Arts, the method proposed by Dr. Clark for purifying water for the supply of towns was described by him, and its applicability for this purpose discussed.

The substances with which water is contaminated may be in two states—suspended and dissolved; both may contain mineral and organic substance.

Spring water contains from $\frac{1}{20000}$ to $\frac{1}{1000}$, or even $\frac{2}{1000}$, dissolved substance, but no suspended substance. This is the case with many kinds of water in and around London; but, when collected at the surface in reservoirs, and exposed to light and air, vegetation commences, and is succeeded by the development of animalcules. After a time, both the plant and animal organisms pass into a state of putrefaction, and become a source of serious contamination.

The water of rivers generally contains less dissolved substance than that of the springs in the same district, and it also contains suspended substances of various kinds that are washed into the rivers from the banks by small streams, rivers, &c.

The separation of suspended substance is effected either by subsidence or by filtration.

The nature of the dissolved substance depends upon the kinds of strata traversed by the water; it generally consists, for the most part, calcareous salts—sometimes with magnesian salts—alkaline salts, ammoniacal salts, rarely, and in small amounts.

The calcareous and magnesian salts communicate to water the character of *hardness*. This character varies considerably in amount in different kinds of water, and is expressed in degrees, *each degree of hardness being as much hardness as a grain of chalk, or the lime, or the calcium, in a grain of chalk, would produce in a gallon of water, by whatever means it may be dissolved.*

The hardness of most of the water around London is owing to the presence of dissolved carbonate of lime. The amount is so large, that the average supply of water to a single family would yield in eight months 100 pounds of chalk, and in 100 gallons of water there is enough to destroy 35 ounces of soap.

Carbonate of lime itself is very sparingly soluble in water; probably 5000 gallons would be requisite to dissolve one pound avoirdupois. But when combined with an additional amount of carbonic acid, it forms bicarbonate of lime, which is so much more soluble in water, that one pound of carbonate with seven ounces additional of carbonic acid would dissolve in 400 gallons of water; and this is about the amount present in well-water from the chalk strata.

The carbonic acid may be separated from carbonate of lime by heating, as in the ordinary operation of lime-burning, and the lime thus obtained is still more soluble in water than the bicarbonate of lime; so that a pound of carbonate of lime, consisting of—

| | |
|---|---|
| Lime - - - - - - | 9 ounces, |
| Carbonic Acid - - - | 7 ounces, |

yields a quantity of lime that may be dissolved in 40 gallons of water.

Thus it appears that carbonate of lime, itself scarcely at all soluble in water, may be rendered soluble in two different ways —either by being deprived of its carbonic acid, or by combining with an additional quantity of carbonic acid.

It is by the latter of these two changes that water, in traversing chalk strata, becomes so highly impregnated with carbonate of lime; for carbonic acid is always substracted from the atmosphere by water during its condensation as rain, &c., and a further amount is frequently dissolved by the water in percolating the vegetable soil.

To separate this dissolved carbonate of lime, so far as may be practicable, is the object of Dr. Clark's method of purification. It is based upon the fact that when a solution of bicarbonate of lime, such as ordinary water, is mixed with a solution of lime, half the carbonic acid is abstracted from the bicarbonate, and both lime and bicarbonate of lime are converted into the very sparingly soluble carbonate.

When this operation is so managed that the lime added is just sufficient to form carbonate with the surplus carbonic acid in the bicarbonate, almost the whole of the dissolved carbonate will be removed from the water, and only so much will remain

dissolved as corresponds with the solubility of carbonate of lime.

Bicarbonate of lime in 400 gallons / Lime in 40 gallons of water. { Carbonate of lime 16 oz. / Carbonic acid . 7 oz. / . . . . . 9 oz. } =16 oz. carb. of lime } =2 lbs

This residual carbonate of lime is always small in amount. Supposing in the above instance the 440 gallons contained 17½ oz. dissolved carbonate of lime, $\frac{10}{11}$ or 16 oz. would be separated, and only 1½ oz. be left in solution. The water, before being softened, would destroy 35 oz. of soap for every 100 gallons; after being softened, the same quantity would destroy only 5 oz.

Most water contains, besides carbonate of lime, calcareous and magnesian sulphates, chlorides, &c. These substances communicate hardness to water, as well as carbonate of lime; but there is the difference—that the hardness owing to the presence of these substances is not removed by limeing. This, however, is not of any practical importance, so far as regards the purification of the water supply of London by this method; for the hardness of the water round London is chiefly owing to carbonate of lime.

Without perhaps being prejudicial to health, the disadvantages arising from the presence of carbonate of lime in water are numerous and considerable.

1. It is the principal cause of the incrustation of steam-engine boilers.

2. It causes a great, and at the same time useless increase in the consumption of soap, and is deposited in dirty linen in such a manner as to fix the dirt, and prevent its being rendered white.

3. For many culinary purposes it is less suitable than soft water.

Dr. Clark's method is remarkable, inasmuch as it differs from most chemical operations in not introducing any other substance into the water in place of the carbonate of lime separated; and, moreover, the separation is effected without the use of any substance foreign to the water in its natural state.

There is another effect produced by this method of purifying water, which does not appear to have been at first anticipated by Dr. Clark. It is the removal of organic substance.

In general the wholesomeness of water is much more affected by the presence of organic substance than by mineral substance; and it seems to be a fact well established by observation, that some of the poisons producing epidemic disease find a congenial habitat in water contaminated with organic substance. Moreover, when organic substance in water undergoes putrefaction, the sulphates always present in water are decomposed, and sulphuretted hydrogen generated. The deleterious character of the water of the Niger was ascribed by the late Professor Daniell to this circumstance.

The amount of organic substance in water may be very minute, but it must not on that account be regarded as insignificant. The amount of organic substance in the most defective kinds of water supplied in London, is very small in proportion to the mineral substance; but it is generally considered by recognized authorities, that, under certain conditions, this organic substance may acquire such a state as to produce disease in those drinking it habitually. In this respect the cause of disease existing in water is analogous to that known as sausage-poison, and that producing the frequent fatal effects of a cut with a dissecting knife, neither of which appear to be chemically tangible.

Investigations relating to the last epidemic of cholera have shown that in one district in London, containing a population of 500,000, which were chiefly supplied with water by two different companies, there were over 4000 deaths from cholera during the epidemic. The only recognizable difference in the conditions and modes of the inhabitants, was, that one portion were supplied with water of good quality, drawn from a point high up the Thames; while the other portion were supplied with water drawn from a lower point of the river, where it was profusely contaminated with town-drainage. It proved upon inquiry that the mortality among the former portion was 37 in 10,000, while among the other portion it was 130 in 10,000, or three-and-a-half times as great as in those houses supplied with the better water. Further inquiry showed that in the epidemic of 1848–49 the mortality was uniform throughout the district. There was no such difference between the houses supplied with water by the two companies, the mortality being in one case 118 and in the other 125; but at that period both companies drew their

water from nearly the same part of the Thames, low down, where it was contaminated with town-drainage.

The method of purification proposed by Dr. Clark not only effects the separation of carbonate of lime, which as regards the wholesomeness of water is of secondary importance, but it also separates organic substance. At the print works, in Manchester, it is applied specially for this purpose, and in an experiment made upon 3,000,000 gallons at the Chelsea Water Works it is stated by Dr. Miller that the amount of organic substance was reduced to one-third.

Some doubt was expressed by speakers who took part in the discussion, as to whether the organic substance removed by limeing was that suspended or that in solution. Both are in fact removed, but it does not appear that there are any grounds for regarding the one more prejudicial to health than the other.

The removal from water of the carbonate of lime dissolved by carbonic acid, has also, indirectly, an influence upon the contamination with organic substance, by serving as a preventive of vegetation, and of the consequent development of animal organism.

When chalk spring water is pumped up from a well and exposed to light and air, in a clean glass vessel, capable of holding a few gallons, with a glass covering, and so exposed that the changes can be observed as they take place from day to day, it will be seen that all around the sides and bottom a green vegetation will appear in summer time within a few days. In process of time this vegetation tends to a brown, and if a close observation be made, a slight incrustation may be discovered, partly to float on the surface of the water, and partly to adhere to the sides and bottom of the vessel. This incrustation consists of carbonate of lime, slowly precipitated from the water by the separation of the duplicate dose of carbonic acid that kept the carbonate of lime dissolved. It is this carbonic acid that serves as the food of plants, furnishing carbon to them, and the carbonate of lime that was kept in solution by it forms the mineral part of the incrustation. If the glass vessel, after having been exposed as described for several weeks, be emptied, a dirty brownish incrustation, including vegetable substance, may be very well seen, all down the sides, and on the bottom. This

brownish incrustation has a strong, offensive, marshy smell. If side by side with the spring water there be exposed, in a similar glass vessel, the same water, previously softened, the softened water will continue for weeks and months unaltered, while that unsoftened water is becoming more and more contaminated by vegetation.

So long back as 1851, the commissioners appointed to report on the quality of the water supplied to London, remarked, that "it appeared to be only a question of time, when the sense of the violation of the river purity (by town drainage) would decide the public mind to the entire abandonment of the Thames as a source of supply, unless artificial means of purification were devised and applied." They also stated, "that a careful series of experiments left no doubt in their minds that the means of conducting this process are certain in their results, and sufficiently simple to be left to the execution of a workman of ordinary intelligence, that the process falls easily into the routine operations of water-works . . . is not attended with any peculiar difficulty on the large scale, and that the softening of Thames water in its ordinary condition by this process is perfectly practicable, at a cost which would, on the average, increase the price charged to the consumer only four per cent."

Nevertheless, there is only one instance in which this process has been applied to the purification of water supplied for general purposes. At the Plumstead Water-Works, near Woolwich, it has been in successful operation for the last year and a half. The water supplied by this Company is derived from the chalk by boring, and has about twenty degrees hardness, which is rereduced to eight degrees by limeing. The works are capable of supplying 600,000 gallons daily, and at the present time about 3,000 houses are supplied.

Eight months after the Plumstead Water Company had been carrying on the softening process with success, and much to the satisfaction of the consumers, it occurred to the Company to try how far the consumers would continue to be satisfied with the water, if the softening process were omitted.

The consequence was that by the twelfth day the surface of the unsoftened water in the reservoirs, though daily renewed, was covered with masses of confervæ to such an extent, that

scarce a square inch could be found clear, and a powerful stench of decaying vegetable substance was evolved. Complaints of the water soon followed, and the experiment was discontinued.

In the course of the discussion Mr. Braithwaite put forward objections to the application of Dr. Clark's method of purification, on the ground that a certain amount of lime was necessary for maintaining the functions of animal life, and cited, in support of his argument, experiments made by Liebig, upon pigeons and cows. But, the quantity of lime supplied in solid food is much more than adequate to these requirements; in many districts, the water consumed by large populations, and by great numbers of cattle, is soft water, with a very small amount of lime in any state; and further, the lime salt, required for the formation of bone, is not carbonate, but phosphate of lime, which is never present in water to more than an infinitesimal amount. Moreover, the experiments cited by Mr. Braithwaite are quite inapplicable to the case in question, because, in those experiments, lime was entirely abstracted from the solid food, as well as from the water supplied to the animals. — *London Pharmaceutical Journal, June*, 1856.

---

## ON THE DISTILLED WATERS OF THE PHARMACOPŒIAS.

By Mr. Haselden.

The author stated that what he had to communicate was submitted to the meeting, not as comprising anything new, but in reply to the request which had been made that those practically engaged in the preparation of distilled waters would give the results of their experience on this subject. He adverted, first, to simple distilled water, which he thought ought to be more generally used in pharmaceutical operations than it was at present. It would, he said, be a desirable point gained if the colleges were to direct in future Pharmacopœias, that whenever water was ordered, either in preparations or in prescriptions, none other than distilled water should be used. This would obviate some difficulties which occasionally arise on account of differences in the appearance of medicines made from the same prescription, but dispensed at different houses. In order to keep up a cheap and sufficiently abundant supply of distilled water, an

arrangement should be adopted, wherever practicable, for having it condensed by a condenser, used for no other purpose, from a source of steam constantly in operation.

"I now turn to the other waters, which seem hitherto to have enjoyed the larger share of attention, and these for the sake of convenience, and not to occupy too much time, by considering each separately, I have arranged in three divisions, as my experience has led me to consider most appropriate. In the first division I have placed dill-seed, caraway, fennel, cinnamon, and pimento waters, in the preparation of which I am of opinion that the process of distillation is preferable to any other, as they are not likely to be contaminated with much mucilaginous matter, which might render them particularly liable to become sour; of these five, the fennel and pimento give the most trouble, the pimento continually depositing, for which I have found no better remedy than filtration; the fennel, if kept long, and there is not a large demand for it, becoming ropy, for which I believe a little spirit to be the best preventive.

"The excess of oil which generally passes over in distilling these waters, where the material acted upon is good, should be shaken well up with the water and transferred to the stock vessel, allowing it afterwards to separate, and when required, running it semi-opaque as it may be into the ordinary bottles in daily use; the oil being left in the stock vessel assists in preserving the water, and keeps it the full strength to the last. Occasionally remove the surplus oil when a fresh supply of water is put in, and the oil so collected will be found pure and fit for every purpose for which it may be required.

"In the second division I place peppermint, spearmint, and pennyroyal waters, and in preparing these I consider that trituration with magnesia or fine sand, always supposing that genuine oil is used, answers extremely well; but, as with the former, they should be kept in quantity, made some days before required for use, allowed to settle, and drawn off as wanted without being filtered. I can see no objection to the employment of magnesia, as ordered in the Pharmacopœia of 1836; the impression held by some that it absorbs the oil, and reduces the strength of the water, appears to me an erroneous one. Volatile oils are not given to saponification.

"In the third division I have rose and elder-flower waters, and with these I return to the plan of distillation, preferring the pickled to the fresh flowers, as I think the water from them is more permanent in odor and keeps better, being less mucilaginous and less apt to turn sour; these should also be kept in bulk, allowing the unsuspended attar, or volatile oil, to remain, and filtering as required. With the pickled flowers there is also the advantage of being able to draw any quantity as most convenient, according to consumption. The addition of spirit to rose and elder-flower water is, I think of no advantage, but rather the reverse, as these waters are principally employed, pharmaceutically, in collyriums, where the presence of spirit may be objectionable. Otto of roses should not be used for making rose-water unless it be intended merely as a perfume.*

"Stone, or non-porous earthern jars, I believe preferable to glass for keeping the waters in; they should be furnished with taps placed about two inches from the bottom, with beaks sufficiently small to fit into the ordinary shop bottle, which may thus be easily filled. The heavier oil of cinnamon will sink to the bottom, whilst the lighter ones will float on the surface. The tap placed as directed will steer clear of both, and the water may be drawn as needed without trouble or inconvenience.

"Before quitting the subject, I will venture to add a word or two upon the operation of pickling. The proportion of salt which answers well is three pounds to one of flowers; they should

* If the following description, which has been given of the method of obtaining otto, is, as no doubt it is, correct, there can be little or no genuine otto imported into this country, looking even at the largest price we pay for it:—"The Rose gardens at Ghazepore are fields in which small rose-bushes are planted in rows. In the morning they are red with blossoms, which are gathered before mid-day, and their leaves distilled in clay stills, with twice their weight of water. The water which comes over is placed in open vessels, covered with a moist muslin cloth to keep out the dust and flies, and exposed all night to the cool air or to artificial cold, as we set out milk to throw up its cream. In the morning a thin film of oil has collected on the surface, which is swept off with a feather and carefully transferred to a small vial. This is repeated night after night till nearly the whole of the oil is collected from the water. It is said that twenty thousand roses are required to yield a rupee weight (rather less than 170 grains) of pure oil, which sells for £10 sterling."—*Hooker*.

be thoroughly mixed, and pressed rather compactly into the vessel in which they are to be kept; and for this purpose an olive oil jar, well cleaned, answers remarkably well."—*Pharmaceutical Journal, July*, 1856.

---

## ON THE PURIFICATION OF AMORPHOUS PHOSPHORUS.

By E. Nicklés.

Amorphous phosphorus, incapable of spontaneous inflammation, is obtained by keeping ordinary phosphorus for some time at a temperature of between 446° and 482° F. in an inert atmosphere; but however long the treatment may be continued, there is always a portion of the phosphorus which escapes the transformation, and which must afterwards be got rid of completely in order to avoid destroying the essential properties of amorphous phosphorus.

The disadvantages of the mode of purification proposed by Schrœtter have long been recognized; it is founded on the solvent action of sulphuret of carbon upon ordinary phosphorus, whilst it has no action upon the red variety. The operation, therefore, seems very simple, but in practice it is attended with much inconvenience and danger; the washings are interminable, and the chances of inflammation increase rapidly with the quantity of phosphorus under treatment. To avoid this danger, Schrœtter recommends that the filter on which the washing is carried on should be kept constantly full of sulphuret of carbon, to prevent the ordinary phosphorus, which is deposited in a very finely divided state upon the edges of the filter, from causing the inflammation of the whole; but even this precaution is not sufficient to avoid accidents.

The author tried several methods of effecting the separation of the ordinary phosphorus by chemical means, but without success, and he has accordingly availed himself of the different densities of the two bodies to effect his purpose, by agitating them with a fluid of specific gravity intermediate between them. Amorphous phosphorus has a specific gravity of 2·106, and ordinary phosphorus of 1·77; a solution of chloride of calcium of 38° to 40° B. will serve for their separation; the ordinary phosphorus being lightest, floats on the surface, when it may be

easily taken up by a little sulphuret of carbon, and the operation may be carried on in a closed vessel.

The process is as follows :—A little sulphuret of carbon is put into the retort in which the conversion has been effected; if the substance, which usually adheres strongly, is not detached, the bottom of the retort is dipped into luke-warm water, when the disaggregation of the substance takes place immediately with a slight noise. When the phosphorus is detached, the saline solution is added, the vessel is closed and shaken, and the sulphuret of carbon containing the ordinary phosphorus floats on the surface. If the proportion of the latter is not more than one-fourth, it may be completely got rid of by a single washing, but it is safer to decant the phosphorized sulphuret of carbon and replace it by a fresh quantity of pure sulphuret. This is necessary when the two forms are mixed in equal proportions, but the author says that three washings are always sufficient to remove every trace of ordinary phosphorus.

After separating the two liquids by decantation, the saline solution containing the amorphous phosphorus is poured upon a cloth, when the purity of the product is so perfect that there is no occasion to boil it with a solution of caustic potash. The whole operation may be completed in half an hour and without the least danger, so that it may be carried on even by inexperienced hands, which is of no small importance now that red phosphorus is an article of commerce.—*Chemical Gazette, May* 1856, *from Comptes Rendus, April* 1856.

---

## CONDITIONS OF SUCCESS AND CAUSES OF FAILURE IN PHOTOGRAPHY.

Babo* has made a number of experiments relating to this subject. His results lead him to the opinion that absolute neutrality of the substances employed in producing the film of iodide of silver, is an essential condition. The collodion may be defective in this respect, a trace of free acid causing a decomposition of the iodine compound, and thus affecting the sensibility of the film of iodide of silver. The addition of finely divided

* Berichten u. d. Verhandl. d. Gesell. für, Reförd. d. Naturwiss. zu Freiburg, 1855. and Ann. d. Phys. u. Chem.

silver to the collodion in order to remove free iodine, is not always attended with success, and after some time, silver decomposes the collodion, in the presence of iodine or iodide of potassium, rendering it thin and useless, a precipitate also being formed, containing, besides organic substance, iodate of silver. Again, the neutralization of the free acid by means of alkali, is very difficult of execution.

Babo finds that different compounds of iodine differ in the decomposing influence exercised by them upon collodion, and that this influence varies for the same compound, according to the proportions of ether, alcohol, and water, in the collodion. The greater the amount of the two former substances, the more durable is the collodion. He finds that for this purpose the most stable of the iodine compounds is the iodide of tetræthylamine. This is probably owing to the fact that, in the decomposition of this substance, iodic acid is not formed, but triodide of tetræthylamine, which is less readily decomposed. The collodion prepared with iodide of potassium or of ammonium, is rendered much more stable by diluting it with ether and alcohol, adding a little iodide, and then boiling, previously to the addition of the whole of the iodide, with some pure urea, in an apparatus that admits of the ether being condensed and flowing back. By this means, any trace of nitric acid is removed. The collodion, which may in this operation have become slightly yellow, is then to be agitated with silver, and, when decolorized, decanted or filtered and mixed with the proper quantity of perfectly neutral iodide of potassium. A very sensitive preparation is thus obtained. It might, indeed, be advantageous before dissolving the cotton to boil it with a solution of urea.

The absence of any reducing substance is quite as essential as the neutrality of the collodion; aldehyde, sulphurous, pyrogallic, and formic acids, sulphuretted hydrogen, alloxantine, protoxide of iron, retard or neutralise the action of light. This would appear to account for the fact that collodion loses sensibility when kept long, for by the liberation of iodine, aldehyde is formed. It follows, moreover, that the alcohol and ether used in the preparation of collodion should be freshly distilled over caustic potash.

The presence of iodate of silver in collodion almost entirely

prevents the action of a faint light, and as this salt is formed by the action of iodine upon nitrate of silver, this is another cause of the slight sensibility of collodion containing free iodine.

When nitrate of silver solution is mixed in the dark with iodide of potassium in excess, then exposed to light and mixed with pyrogallic acid, no immediate reduction takes place. Further, iodide of silver precipitated with excess of iodide of potassium, collected on a filter and washed in the dark, is not sensitive. But when the amount of iodide of potassium mixed with the silver solution is insufficient to precipitate the whole of the silver, there is an immediate reduction of silver on the addition of pyrogallic acid. The same result takes place when pure iodide is mixed with some nitrate of silver, provided the amount is too small to determine the solution of any iodide, in which case the sensibility of the substance is reduced.

This circumstance is undoubtedly not only a frequent cause of failure, but also of uncertainty in the character of the picture produced. The quantity of silver, not converted into iodide, that is taken up by the collodion film, depends upon circumstances which are not always to be controlled. Among these, the strength of the silver solution, and the amount of iodine compound in the collodion are of prominent influence, but phenomena of diffusion must likewise be concerned within certain limits. The interchange of substances between the collodion and silver solution must be very complicated, dependent upon the amounts of alcohol and ether, indirectly upon the temperature, and upon the amount of undecomposed silver solution taken up, according to the nature of the iodine compound used. Babo is of opinion that in this respect a more certain result is obtained with ethylamine or urea salts, than with salts of potash or ammonia. He found collodion prepared according to the following formula, very suitable for silver solution, containing from eight to nine per cent. of silver salt:—

| | | | | For developing the picture. | |
|---|---|---|---|---|---|
| Pyroxyline | 1 | . . | — | Water | 100 |
| Alcohol (80 per cent.) | 30.0 | . . | 40.0 | Alcohol | 20 |
| Ether | 50.0 | . . | 60.9 | Acetic Acid | 30 |
| Iodide of tetræthylamine | 0.5 | . . | 1.0 | Pyrogallic Acid | 1 |

Attempts to substitute aldehyde, ammonia, alloxantine, phosphorous acid, &c. for pyrogallic acid, proved unsuccessful. The

best result was obtained with protosulphate of iron mixed with a few drops of phosphorous acid, but this liquid has the disadvantage of attacking the shadows, which is not the case with pyrogallic acid.—*Pharmaceutical Journal, June*, 1856.

---

## NEW FORM OF ASTRINGENT APPLICATION.

By Dr. William Bayes, Brighton.

Pure glycerine dissolves nearly its own weight of tannin, affording a very powerful local astringent application.

The solution of tannin in pure glycerine appears to me to supply a desideratum long felt, and capable of a great variety of useful applications.

The solvent property of glycerine over tannin, allows us to form a lotion of any desirable strength, as the solution is readily miscible with water.

The solution of tannin in glycerine, in one or other of its strengths, is peculiarly applicable to many disorders of the mucous membrane, readily combining with mucus, and forming a non-evaporizable coating over dry membranes; hence it may with benefit be applied to the mucous membranes of the eye and ear in many of its diseased conditions. It forms a most convenient application to the vaginal uterine, urethral, or rectal membranes, where a strong and non-irritant astringent lotion is desired.

In local hæmorrhages, where the bleeding surface can easily be reached, it will prove very convenient, and may be applied either with a sponge or small brush.

The solution must be kept in the dark, and should not be prepared for any great length of time before used, or decomposition will occur.

It is singular that glycerine does not possess the same property towards gallic acid.—*Charleston Medical Journal, from Association Med. Jour.*

---

## ON THE SOLUBILITY OF BONES IN WATER.

By Prof. Wöehler.

Translated by J. M. Maisch.

If ground bones, as they are prepared at bone mills for agricultural purposes, are left in contact with water for some time,

the liquor, when filtered, contains phosphate of lime and phosphate of magnesia in solution. The same is the case if water be used, from which, by long continued boiling, all carbonic acid has been expelled. Water was filtered for several months through the same quantity of ground bones, constantly taking up some of the phosphates of those earths whose amount even seemed to increase as the organic matter of the bones, by its continued contact with water and air, was putrified, and the passed water became turbid and fœtid. These facts appear to be not without their practical value for agriculture, as the earthy phosphates of the bones, without artificial preparation, may be dissolved, and thus carried to the ground, probably in a quantity which is just necessary for the functions they have to perform. For the use of ground bones, as manure, it would suffice perhaps to prepare them simply by keeping them during the summer time moist and in heaps.—(*Annalen d. Chem. and Pharm.*, April, 1856, p. 143.) J. M. M.

---

## PREPARATION OF PURE SILVER FROM ITS ALLOY WITH COPPER.

By Dr. W. Wicke.

The alloy is dissolved in nitric acid, the excess of the acid expelled by boiling, the solution diluted with water and the oxides precipitated by an excess of carbonate of soda at an elevated temperature. By heating the carbonates with a solution of grape-sugar, the oxides are reduced, the oxide of copper to the sub-oxide, the oxide of silver to the metal. The reduction commences immediately, but the boiling must be continued for some time to insure the reduction of all the carbonate of silver. The precipitate is filtered; and while still moist treated with a warm solution of carbonate of ammonia, which dissolves the copper, leaving pure silver behind; the operation is continued until the carbonate of ammonia ceases to assume a blue color. The washing may be done by decantation. If the silver is not wholly reduced, the carbonate of ammonia will also dissolve carbonate of silver. I have boiled with grape-sugar about ten minutes, and the ammoniacal solution was free of silver.

Instead of using carbonate of soda, very likely the oxides may be precipitated from a hot solution by potassa and reduced as above stated.

This process is a simple one, and the operation takes but little time.—*Ibid.* p. 144. J. M. M.

---

## PREPARATION OF CUMARIN.

By Prof. Wöehler.

According to Dr. Goessmann, the best way to obtain cumarin is by the following process: Tonka beans are cut finely, and with about their volume of 80 per cent. alcohol heated to near the boiling point; after filtering, the residue is again treated in the same manner. Of the mixed liquors, alcohol is distilled off until they become turbid, and are then mixed with about four times the volume of distilled water, by which a crystalline precipitate of cumarin is produced. The mixture is boiled and run through a filter moistened with water, which keeps the precipitated fat back; pure cumarin crystallizes from the solution on cooling. By concentration of the mother liquor, the balance may be obtained, which, if not quite colorless, must be purified by animal charcoal. By this process Mr. Eastwick, Jr., obtained over 8 grammes of cumarin from one pound of tonka beans.—*Ibid.* p. 66.

J. M. M.

---

## ON THE SO-CALLED ALIZARIN INK.

By J. Winternitz.

Every one who knows alizarin, the red coloring principle of dyer's madder, will expect a red ink to which the name of alizarin ink is applied, and he cannot fail to be astonished to find it, instead of a red, of a dark green color, and the writings with it soon change to dark blue and black. The above name, therefore, is a mystification, invented to conceal its ingredients and mode of preparation, and to mislead an attempted analysis. No doubt many have tried in vain to prepare such an article as it has appeared in commerce a short time since, from madder, but obtained an entirely different product.

The author has made an analysis of alizarin ink of commerce,

and found it to consist of ordinary black nutgall ink, with an admixture of crude wood vinegar and solution of indigo. He gives the following formula for preparing such an ink, which, in all its properties, is identical with the commercial article :—

100 parts of powdered nutgalls are digested with 1200 parts, by weight, of crude wood vinegar at a moderate heat for several days, then transferred to a filter, and washed with crude vinegar until the filtrate weighs 1200 parts. In this clear brown liquor, 12 parts of green vitriol and 50 parts of gum arabic are dissolved, this solution, under frequent agitation, set aside for several days, and at last so much solution of indigo added to make the whole 1500 parts, when immediately the ink assumes that peculiar dark green tint. The solution of indigo was made by dissolving one part of indigo in 4 parts of Nordhausen oil of vitriol, diluting with water, precipitating with carbonate of potassa, filtering, and washing the precipitate with water. When the sulphate of potassa is nearly washed away, the blue precipitate commences to dissolve ; and this solution of the precipitate—the so-called indigocarmine—was used.—(*Wittstein's Vierteljahrsschrift*, v. 225.) J. M. M.

---

## PREPARATION OF THE OILS OF CROTON TIGLIUM, NUTMEGS, AND LAUREL BERRIES BY MEANS OF SULPHURET OF CARBON.

By M. Lepage, of Gisors.

M. Lepage, taking advantage of the great solvent power of bi-sulphuret of carbon, in view of the low price at which it can now be had in France, has prepared it as a means of extracting medicinal fixed oils from the tissues of plants containing them.

*Croton Oil.*—The croton seeds, well divided by grinding, are introduced into a bottle with three times their weight of sulphuret of carbon, which has been carefully rectified; allow it to stand twenty-four hours, with occasional agitation, and then express rapidly in a cloth. The dregs are mixed again with two parts of that solvent in the bottle, macerated again for twenty-four hours and again expressed strongly. The two products are united, filtered in a covered funnel, and then subjected to distillation in a glass retort with a water bath heat, with a good condensing

apparatus. As soon as the distillation ceases, pour the oily residue into a capsule, and after being assured that the last traces of the sulphuret have disappeared, put the oil in bottles for use.

The recovered solvent is pure and fit for use again. This process yields 52 per cent. of oil of equal activity with that obtained by other processes.

The oils of *Laurel berries and Nutmegs* can be readily prepared in the same way, by submitting these substances to the action of the sulphuret, with subsequent pressure, etc., and whilst the resulting oils are entirely free from the odor of the solvent, they retain their peculiar volatile oils, so as to be highly aromatic.—*Journ. de Chimie de Méd.*, Juillet, 1856.

---

## ON THE PRODUCTION OF VERY HIGH TEMPERATURES.

Sainte Claire Deville has published an extended description of the methods employed in his laboratory to produce high temperatures, and his paper possesses great value and interest. For operations on a small scale, Deville employs a lamp of peculiar construction, in which the vapor of oil of turpentine or any other liquid of hydro-carbon is completely burned by means of a powerful artificial blast of air. The lamp in question would be scarcely intelligible without a figure, and we must refer for fuller details of its construction to the original memoir. By its means a heat sufficient to melt feldspar can be easily produced, provided that the table bellows employed is of sufficient size and power. [We have found it in practice less safe and convenient than the gas blast lamps with sixteen jets, introduced by Sonnenschein, but gives a higher temperature. W. G.] The other apparatus described by the author is a blast furnace, in which platinum and many other substances can be fused. It consists of a cylinder of fire-clay 18 centimeters in diameter, and somewhat higher than its width. This may be surmounted by a dome, to prevent the escape of the coals from the force of the blast. This cylinder rests upon the edge of a hemispherical cavity, connecting with a good forge bellows. A circular piece of cast iron, pierced with openings about 10 millimeters in diameter, and disposed round the edge of the plate, forms the bottom of the cylinder and sepa-

rates it from the cavity below. The author employs as fuel, cinders from the hearth of a furnace heated with the dry coal of Charleroy. These cinders are found mixed with pieces of coal, and are sifted upon a sieve with square holes of 2 millimeters in the side. What passes through the sieve is rejected. The force of the maximum temperature begins about 2 or 3 centimeters above the iron plate, and is only 7 or 8 centimeters high. The coals employed must vary from the size of a small pea to that of a nut. The crucible is placed in the centre of the cylinder and surrounded with kindled wood, upon which pieces of coal of the size of a nut are laid, and upon these the proper fuel of the furnace. The blast is then forced in slowly and gradually increased. The coals above remain cold from the transformation of the carbonic acid into carbonic oxyd, which gas, in the author's furnace, burns with a flame 2 meters in height. The heat produced by this arrangement is called by the author the "blue heat," from its peculiar tint. In it the best ordinary crucibles run down like glass. The author uses three kinds of crucible. The first is of quicklime and is made of well burned lime, slightly hydraulic, which is cut with a knife or saw into prisms, with a square base 8 or 10 centimeters in the side, and 12 or 15 centimeters high. The edges are rounded and a hole is made in one end of convenient size. Sometimes an inner crucible is used, each having its own cover. When the substance to be heated is very refractory, only one crucible is used, and the walls of this are made 3 or 4 centimeters thick. The base of the crucible must be 5 or 6 centimeters below the bottom of the cavity. The space between the crucible and the walls of the cylinder must be 5 or 6 centimeters. In using a lime crucible, charcoal is first to be introduced, little by little, till the crucible is covered, the heat is then very gradually increased till the crucible becomes red, when the coals are removed to make sure that the crucible is not cracked, after which the heat may be urged to the utmost. The second kind of crucible is of carbon. The author uses gas-retort carbon and fashions it on a lathe. To free the material from impurities it may then be strongly heated in a current of chlorine, by which process it loses weight. These crucibles are placed within crucibles of lime, the intervening space being filled with calcined alumina. The third species of crucible is made of alumina, obtained by calcin-

ing ammonia-alum. Thus prepared it is plastic, but shrinks much on drying. To prevent this, the author mixes the mass with a calcined mixture of alumina and marble. A mixture of plastic alumina, calcined alumina and aluminate of lime, in equal parts, gives a very hard and infusible mass, which softens a little at the melting point of platinum. Once baked, these crucibles resist all tests; even sodium has no action on them. The lime crucibles may be used whenever the alkali is not injurious; the carbon crucibles have a more limited use in consequence of their reducing agency. The alumina crucibles may be used almost always when lime will not answer. With respect to the heat produced by this furnace the author gives the following details. Platinum fuses in a crucible of lime into a single well-united button. This platinum possesses properties very different from those of ordinary platinum condensed from the sponge. When copper is plated with the fused platinum rolled out into a very thin sheet, nitric acid has no action whatever, as it does not penetrate the leaf of metal. A plate made from fused platinum does not cause the union of oxygen and hydrogen even after several hours. Fused platinum possesses a perfect softness and malleability. In a crucible of carbon, platinum melts easily but yields a brittle alloy of platinum, carbon and silicon. By raising the heat above the temperature required for fusion, Deville succeeded in volatilizing the metal with remarkable ease, so that it condensed in small globules. Pure peroxyd of manganese heated with carbon from sugar in quantity less than sufficient to reduce the oxyd, gave fused metallic manganese as a brittle mass, having a rose reflection like bismuth and as easily reduced to powder. Its powder decomposed water at a little above the ordinary temperature. Chromium as prepared in a similar manner was well fused, but not into a button, at the temperature at which platinum volatilizes. The metal is brittle and cuts glass like a diamond. It is easily attacked by chlorhydric acid, but little by sulphuric acid, and not at all by nitric acid either strong or weak. Metallic nickel fuses to a homogeneous button, which may be forged with great facility. It has a ductility almost without limit and is more tenacious than iron in the ratio of 90 to 60, according to Wertheim's experiments. This nickel contained traces of silicon and copper. Fused cobalt is as ductile as nickel

and still more tenacious. According to Wertheim its tenacity is to that of iron as 115 to 60, or nearly double. The most refractory body which the author fused was silica, which, however, in quantities of 30 grammes was not perfectly liquified. The author considers the fusion of this body as the limit beyond which processes do not go.—*American Journal of Science and Arts*, from *Ann. de Chimie et de Physique*, xlvi. 182, February, 1856.

---

## ON THE DETECTION OF IODINE IN MINERAL SPRINGS.

By J. Liebig.

When a very small quantity of an alkaline iodate, followed by sulphuric or muriatic acid, is added to a fluid which contains so small a quantity of metallic iodides that no distinct blue coloration can be obtained by starch and nitric acid, a far stronger reaction is obtained; hydriodic acid and iodic acid being separated, which become mutually converted into water and iodine, so that the amount of iodine set free is increased by the iodic acid added. Neither iodic acid nor iodide of potassium mixed with muriatic acid, colors starch.

When the mother-liquor of a mineral spring was mixed with starch-paste and muriatic acid, with the intention of adding iodic acid to it afterwards, the author observed that it produced as fine a blue color as can be produced by any of the known methods, by means of chlorine-water, hyponitrous acid, &c. The water of the Adelheid spring, the mother-liquor of the Reichenhall bath, and in fact all the waters containing iodine which he examined, behaved in exactly the same manner; with starch-paste, and the addition of pure muriatic acid and free from chlorine and iron, they gave as distinct a reaction as can be obtained with other very delicate reagents. The same muriatic acid gives not the least color with iodide of potassium and starch-paste, so that some body must exist in these waters which sets free the iodine of the iodide, or the liberated hydriodic acid, on the addition of a mineral acid. It seems probable that this may be due to the presence of nitrates, which the author found in these waters, and frequently in large proportion; but he does not feel certain that these are the cause of the reaction, as by mixing such salts with

iodide of potassium, and adding starch-paste and muriatic acid, the reactions were not nearly so delicate as with the mother-liquors, although the latter contained much more iodine in the form of iodides, than was employed in his experiments. The mother-liquors were free from persalts of iron, which might have caused the reaction.—*Chem. Gaz., June* 1, 1856, *from Liebig's Annalen, April* 1856.

---

## ON THE SILVERING AND GILDING OF GLASS.

By J. Liebig.

*Silvering Glass.*—At the request of M. von Steinheil, the author has made some experiments to discover a process for silvering glass *in the cold*, especially with a view to the production of faultless optical mirrors. The silvering fluid, which perfectly fulfils the desired end, is an ammoniacal solution of nitrate of silver with an addition of caustic potash or soda, which, when mixed with a solution of sugar of milk in water at ordinary temperatures, deposits the silver on the surface of the glass in the form of a mirror.

To prepare the fluid, 10 grms. of fused nitrate of silver are dissolved in 200 cub. centims. of water, and a sufficient amount of liquid ammonia is added to produce a clear solution. This is gradually diluted with 450 cub. centims. of a solution of potash of spec. grav. 1.05, or with the same volume of a solution of soda of 1.035. On the addition of this, a blackish-brown precipitate is usually produced, which must be at once dissolved by a fresh addition of liquid ammonia. The mixture is diluted with so much water as to bring it to 1450 cub. centims. A dilute solution of nitrate of silver is then dropped in until the production of a strong gray precipitate (not turbidity), when the mixture is brought to 1500 cub. centims. by the addition of water. Each cubic centimetre thus contains a little more than 6.66 milligrms. of nitrate of silver, or 4.18 milligrms. of silver. To produce a clean mirror, the fluid should contain no free ammonia, but this must be completely saturated with oxide of silver. For this purpose some of the solution of silver may be kept back and added at the end; and in this case 1 cub. centim. of the solution contains rather less than 4.18 milligrms. of silver.

The solution of potash or soda must be free from chlorides; pure carbonate of soda or potash must be dissolved in water, and rendered caustic by hydrate of lime previously freed from all chloride by washing with distilled water. The solution is not filtered, but left to stand until it becomes perfectly clear.

Immediately before the application of this fluid, it is mixed with one-tenth to one-eighth of its volume of solution of sugar of milk, containing 1 part in 19 parts of water.

In silvering small concave or convex mirrors, a stick or brass hook is attached to the back of the glass by a resinous cement, so as to enable the glass to be suspended horizontally. It is suspended over a suitable glass or porcelain saucer, with the surface to be silvered about half an inch from the bottom of the vessel, and the fluid previously mixed with the solution of sugar of milk is poured in until the whole surface of the glass is immersed.

For the production of flat mirrors the author recommends vessels of gutta percha, cut out of a flat piece so as to have a margin of about an inch all round the glass. This is turned up after the gutta percha has been softened in hot water, and the corners are made water-tight by the application of a hot spatula or knife. The glass is supported, at a distance of half an inch from the bottom of the vessel, by means of small cones of gutta percha at the corners, and the space between the surface of the glass and the bottom is then filled with the silvering fluid. The author admits that these arrangements are very imperfect, and that many improvements might be introduced, but the glass should always be suspended at the surface of the fluid.

The reduction of the silver takes place instantly upon the mixture of the alkaline solution of silver with the sugar of milk; the mixture immediately acquires a dark color. In a few minutes the glass plate appears black; in a quarter of an hour it becomes bright, and the reduction is complete when the fluid between the edge of the glass and the wall of the vessel is covered with a white specular coat of silver. Of course the whole of the silver in the solution is precipitated, and only a very small portion of it goes to form the mirror. The quantity of silver attached to a surface of 226 square centims. was 49 milligrms. The silvering of a mirror of 1 metre square would consequently take 2.210 grms.

of silver. The quantity of fluid required to silver a glass of 226 square centims. was 280 cub. centims., containing 1170 milligrms. of silver, so that 1170—49 =1121 milligrms. of silver are thrown down in the fluid and on the walls of the vessel; this must be collected, and again converted into nitrate of silver, and some loss is unavoidable.

When silvered, the glass plate is taken out of the fluid, washed with warm distilled water, and dried in a warm place. Care must be taken, in removing and washing the plate, not to injure the silver coat with the fingers, as otherwise the water penetrates by capillary attraction through the injured spot, and separates the coat of silver from the glass. When dried, the silver adheres so strongly to the glass that it can hardly be rubbed off with the finger. It forms a very beautiful, somewhat opalescent mirror, which may be converted into a perfect silver mirror by careful polishing with fine rouge and velvet. A good deal depends on the cleaning of the glass in the production of perfect mirrors.

The distance between the bottom of the vessel and the surface of the glass must be exactly equal throughout, as otherwise the thickness of the coat of silver will be unequal, and the places where it is thinnest will appear darker than the rest. The smallest bubble of air also will cause a small vacancy in the coating, and the author has found it advantageous to moisten the surface of the glass in the first place with alcohol, as this displaces the adherent stratum of air more readily than water.

When placed at the bottom of the vessel the glass plate is just as completely coated, but the whole of the silver in the solution is precipitated upon it in the form of a gray powder, which adheres so strongly that it can only be got rid of by mechanical means, which endanger the mirror itself. The cost is also greatly increased.

Before putting it into a frame, the dry mirror is warmed a little, and coated with a thin colorless varnish. For this purpose a solution of dammara resin in alcohol is very good.

*Gilding of Glass.*—Glass can only be permanently and brilliantly gilt with the assistance of heat. Gilding effected in the cold is of beautiful color and lustre, but does not adhere, and detaches itself from the glass by washing with water.

The gilding fluid is prepared by dissolving pure gold in nitro-

muriatic acid, adding 292 milligrms. of chloride of sodium to the solution for every gramme of gold, evaporating to dryness, and heating the residue until all free acid is driven off. The double salt is then dissolved in water, and water is added until each 100 cub. centims. of fluid contains exactly 1 grm. of gold. 50 cub. centims. of this solution are mixed with 20 cub. centims. of a solution of soda of spec. grav. 1.035, and 300 cub. centims. of water in a glass flask, and boiled until it is reduced to 250 cub. centims.; and another 50 cub. centims. of the solution, mixed with 20 cub. centims. of the same solution of soda and 230 cub. centims. of water, are kept for an hour in boiling water. The two fluids are then mixed together, and must be employed in gilding whilst fresh.

To gild the inside of a glass vessel, a tenth part of its volume of a mixture of 2 parts of alcohol and 1 part of ether is poured into it, and it is then filled up with the hot gold solution. The vessel is then set in water, the temperature of which must not rise above 176° F. In from ten to fifteen minutes its inner surface is covered with a brilliant golden film, and the vessel is removed from the water when its walls are opake, or exhibit a deep green color by transmitted light.

The alkaline solution of gold is of course always reduced by the alcohol, but the glass only acquires its brilliant golden coat when the fluid is of such a nature that the adhesion of the gold to the glass may be somewhat stronger than that to the water; in the former case the gold is precipitated only on the glass, in the latter only in the fluid. It is very difficult to hit this point exactly, and the smallest error in the mixture renders success impossible. The author adds, that he has obtained the most beautiful gilding by this means, whilst in other cases he has failed entirely, without being able to discover the cause, so that he does not think this method will be of general application. The mixture will only act whilst fresh, when it has a very slight yellowish tinge; by standing it becomes colorless. Alcohol reduces the gold from the colorless fluid with difficulty.—*Ibid, from Liebig's Annalen, April* 1856.

## ON THE CONVERSION OF TANNIC INTO GALLIC ACID IN THE EXTRACTS OF TANNING SUBSTANCES.

By Prof. Calvert, of Manchester, Eng.

During a recent visit of M. Calvert to Paris, he read several papers at the session of the Societé de Pharmacie of June the 4th, 1856, and among them one with the above caption. The first experiments were to determine the special action of tannic and gallic acids in the dyer's vat by dipping pieces of mordanted stuff in solutions of tannin and gallic acid of definite strength and at different temperatures. It resulted that the gallic acid liquid quickly dyed the tissue, but was very evanescent, whilst the tannin solution acted more slowly, giving a permanent dye. These facts induced the belief that gallic acid acted on the mordant by reducing the iron to protoxide, and on testing the liquor of the bath he found a large quantity of protoxide of iron; whilst, in the other tannic liquor, no reduction had occurred. This property of gallic acid increases in the presence of hydrochloric, sulphuric and oxalic acids, whence it follows that gallic acid cannot be used for dyeing when in excess or in presence of other acids, whilst in the case of tannic acid, acids, except in decided excess, do not favor reduction. He believes, in consequence, that under the influence of a great excess of mineral acid, tannic acid is separated into sugar and gallic acid, and the last substance acts as a reducer. These facts explain why calcareous water is found to yield the best blacks.

M. Calvert then tried the relative behaviour of these acids with alumina mordant. Pieces of calico previously mordanted were put in baths of gallic and tannic acids at 212° F., for 2¼ hours. The specimens were then withdrawn, washed with distilled water, and tinted with madder. The specimen with gallic acid was nearly colorless, whilst the other was of a beautiful deep red. Other experiments were tried with the same result; but to remove all doubt the author added pure hydrate of alumina to a solution of each of these acids, when he found that the gallic acid dissolved the alumina, whilst the tannic acid did not effect it.

The author tried to obtain reds and blacks with an extract of sumach long made, and had not succeeded, probably because its tannin was converted into gallic acid. He found that whilst a

few weeks' time was sufficient to effect the change in the extract, years may elapse before the plant itself is so affected, owing probably to the presence of water in the former.

In view of this change being a species of fermentation, as shown by MM. Delarocque and Robiquet, the author sought for an agent which, whilst it would not interfere with the proper function of the extract as a dye, would prevent the transformation of the tannin.

The result of his research was that chloride of lime, corrosive sublimate, and carbolic acid (or mineral tar creasote), were each capable of arresting the change; the latter being the most active and least interfering with the process.*

The author says that a solution of gallic acid would dissolve metallic iron with the elimination of hydrogen, whilst with a solution of tannin no gas is given off, though the solution is stained, probably owing to the presence of a little oxide of iron.—*Jour. de Pharm. et de Chimie, Juillet*, 1856.

---

## MEDICINE IN TURKEY.

Service in the Ottoman army, medical or otherwise, offers no inducements whatever to young Americans. Of actual want one suffers little, but must submit to humiliating embarrassment; while the society of even the first officers cannot possibly be agreeable to a person who is cultivated, or accustomed even to the mere decencies of life. The Turks are slow to perceive merit, and still slower to reward it. The first, and almost the only word of English they learn, is *to-morrow;* and, however gentle and urbane the Mussulman may be in private life, he is a paragon of intrigue and overbearing treatment in office. Foreigners who enter the Turkish service appear to adopt permanently their worst peculiarities. It was related to me by an Italian, in the service at Silistria, that Achmet Pasha once caused several of his physicians to be tied up and flogged, in the presence of the troops. We hear much of foreigners in the Ottoman service; but very few of them, surgeons excepted, ac-

[*Note.—The presence of oil of cloves and some other substances in ink probably act as carbolic acid in preventing the transformation of tannic acid, and whilst thus preventing mould preserves the coloring qualities of the ink.—Editor Amer. Jour. Pharm.]

quire positions of any importance in the army. Their connexion with the service is nominal, rather than actual.

Mussulmen are averse to surgical operations. Surgery is, in fact, rarely called into requisition in the Turkish camp. During the affair of Kalefat, in which 12,000 Turks perished from cold, fatigue, and sorties against the Russians, and when patient Mussulmen became furious maniacs through extreme suffering, but one grave surgical operation was performed, whereas hundreds of lives might have been saved by judicious management.

Comparatively few Turks practise medicine. The professors of the healing art, in the Orient, are mostly Greek and Italian adventurers, who make the simple Moslems the dupes of their charlatanism. The Imperial license to practise anywhere in the Sultan's dominions can be obtained for a few piastres. Even those who are employed professionally in the Seraglio, and penetrate the mysterious harems of Turkish grandees, do not hesitate to administer preparations followed by the most fatal effects. They do indeed profess to teach medicine in the schools attached to the mosques, after the doctrines of Avicenna, Averroes, and other Arab authors; but the practice is founded upon no definite system. The believer in fatality does not fear death; and this is the principal reason why, in times of the plague and cholera, the Turks suffer less than the timid Greeks and Armenians.

The most valuable drugs are to be found in the bazaars; but, in consequence of the profound ignorance of the rudiments of chemistry among the Turks, the pharmaceutical preparations sold in the shops are gross and inefficacious. Distilled water is the ordinary medium for administering medicines.

The Mussulmen Hakims divide all diseases into two classes—nervous affections of the face, and those of an erysipelatous character; and secondly, all maladies not included in the above.

Among the Græco-Slaves, as with the Turks, surgery is monopolised by the knights of the razor. The practice of medicine is confined, for the most part, to magicians and sorcerers. There are no midwives; nature renders them superfluous. The mountaineers have a very efficacious method of treating wounds received in their almost perpetual conflicts. Intermittent fever and dysentery are the prevalent diseases of the climate. As among all uncivilized or half-civilized people, the absence of

favorable circumstances causes the premature death of feeble children. Those only who possess vigorous constitutions live to maturity, while their natural strength is increased by a temperate manner of life, especially in mountainous regions. A rapid increase of population is thereby prevented; but those who survive are more healthy and vigorous than the majority in civilized countries. When a person is attacked with any disease, he at once avails himself of the exorcising prayers of his pope or priest, and then drinks largely of cold water. Hydropathy has, in fact, been in vogue for ages with the Græco-Slaves.—*American Medical Monthly.*

---

## THE CHEMICAL TESTS FOR STRYCHNIA.

By Mr. William Copney.

Perhaps there is no class of the community, the attention of which has been more properly arrested by the Rugeley tragedy, than that of Pharmaceutical Chemists. To them is entrusted the responsibility of preparing, keeping, or dispensing the potent drug, which, by a verdict not of the jury only, but almost of the entire country, was the agent by means of which the poisoner effected his foul purpose.

Whatever opinions may have been entertained as to the necessity and importance of a befitting education on the part of those who are in the habit of compounding medicines containing, in many instances, ingredients of the most energetic nature, there are none, at the present time at least, who would be disposed to call in question its utility. It is not, however, a matter of education only—it is not merely necessary that the Pharmaceutist should be able to recognize the potent agents which surround him, by the physical and chemical properties which distinguish them, or that he should be familiar with their ordinary doses; there rests upon him a moral responsibility: rigid and unceasing care, order and accuracy, must ever be added to chemical knowledge.

In whatever state the recent event found the knowledge of the Pharmaceutist in regard to the characters of strychnia, so much has been said and written about it, that, now at least, it is

an element of the Materia Medica with which he may be supposed to be especially familiar.

To those, however, who have not repeated for themselves the tests by which it may be infallibly recognized, or to those who, having done so, are yet in doubt as to their delicacy, the following may not be unwelcome.

It is not intended to offer any opinion as to whether strychnia, after its exhibition as a poison, and when death has ensued from a *minimum* quantity—when that quantity has been so nicely adjusted that the whole is absorbed before death takes place, or whether, when the body is in a state of advanced decomposition, it may, or may not, be always extracted, but simply to assert the extreme delicacy of the chemical tests; such delicacy indeed do they possess, that it may be fairly stated, that in every case where these give no indications, one of three things must obtain —either that no strychnia has been taken, or, that it cannot *always* be extracted, or, that the process adopted for its elimination was faulty.

Organic poisons, as a class, are admitted on all hands to be less readily recoverable, and even when obtained, to be with much less certainty distinguished than the inorganic. Every practical Chemist knows, that when some of these have entered into combination with other substances, more especially gallic or tannic acids, they are separated with the utmost difficulty. The detection of strychnia, however, is less uncertain; perhaps there is no substance with which the toxicologist has to deal, not excepting arsenic, which displays such distinct and constant features as this.

The principle of the tests is the supply of nascent oxygen; almost any substance, therefore, which will supply this element, when acted on by sulphuric acid, is suitable for the purpose. The same in principle is the application of the galvanic current as proposed by Dr. Letheby, which, moreover, has the advantage of being free from all fallacy dependent upon the presence of other bodies.

There are two conditions necessary to the success of the test —that the strychnia should be obtained in the state of dryness, and that the sulphuric acid employed should be concentrated, not

of a lesser specific gravity than 1·840. An acid whose density is 1·500 is still better.

The substances hitherto employed are binoxide of lead, binoxide of manganese, chlorate of potash, and bichromate of potash. According to my experiments the chlorate of potash is the least valuable, much better the binoxide of lead, better still binoxide of manganese, and best of all, bichromate of potash.

The first thing to be done is the preparation of a solution of strychnia of determinate strength—one grain in 500 minims is a convenient proportion. The solution is readily effected by using equal proportions of rectified spirit and distilled water acidulated with sulphuric acid.

Place one minim of this solution upon a clean white porcelain capsule, and evaporate at a gentle heat to dryness, now add a drop of sulphuric acid, and intimately mix; introduce a small fragment of bichromate of potash, and draw it across the spot. Where the quantity of strychnia is as great as in this experiment *i. e.* the 1-500th of a grain, a saturated solution of the bichromate may be used, and is, in some respects, better, but it is necessary to use it judiciously; a pointed glass rod is dipped into the solution, and enough allowed to remain upon it without dropping; wherever the point of this touches the mixture, the color is developed. This color is blue, which is succeeded by purple, crimson, red, and green, the latter in some instances being eventually replaced by yellow. (These colors are well seen if a small fragment of strychnia be placed in a narrow test tube, and a sufficient quantity of sulphuric acid added to smear the inner surface on inclining and turning the tube about. A little pounded bichromate of potash being introduced, and the tube held so as to trail the acid over it, the most magnificent colors are brought out.) A given quantity of the solution is now mixed with an equal proportion of distilled water, each minim then containing a thousandth part of a grain; from the solution thus formed, it is easy to obtain others of any degree of dilution that may be desired. This dilution may be carried to such an extent, that the 1-500,000th part of a grain may be faintly detected, beyond which I have not succeeded. The method by which this latter quantity was shown, is as follows: prepare a solution of such a strength that one minim shall exactly equal the 1-125,000th

of a grain. Draw out a glass tube of narrow bore to such a degree of fineness, that twenty drops from it shall equal five minims. Allow one of these drops (*i. e.* a quarter of a minim = 1-500,000th of a grain) to fall in the centre of the capsule. Evaporate carefully without stirring, and test as before. The strychnia will be found, upon close inspection, to have collected itself into a ring more or less complete; wherever this is crossed by the test, the color may be faintly seen. The object of using a quarter of a minim, is to circumscribe the deposit; for the same reason it is not stirred during evaporation. No chemist would perhaps be disposed to assert an opinion upon the faint color afforded by this experiment, which is only put forth as an evidence of the extreme delicacy of the test.

*Antimony* was found in the body of Cook. A question arose as to what effect this might have in causing the elimination of the poison, either through the kidneys or other channels; or supposing some strychnia still to remain, to what extent it would mask or prevent the action of the tests. The latter part of this question is, I think, undoubtedly disposed of. The most decisive experiments on this point are perhaps those of Mr. Rodgers. In all cases the strychnia appears to have been recovered unchanged. Whatever effect the presence of antimony, in any of its combinations, might seem to have while in actual contact with strychnia, there need be no longer any doubt that it may be separated from it, and even shown, more or less distinctly, while mixed with it. It may be here observed, that although the suggestion claimed attention from the importance of the subject, both *per se* and in reference to the culprit, it was one which has been truly said, would not, at any other time, have received a moment's consideration. It is not usual for a chemist to apply the tests of any body, at least in toxicological inquiries, while others, which may by possibility be separated from it, are still present.

It must be confessed, however, that some good has arisen out of the inquiry; and it is possible that there is something yet to learn about it. One thing has been undoubtedly shown — that the solubility of strychnia (in water) is greatly increased by the presence of tartar emetic.

The following experiments may not be uninteresting :—

1. One grain of strychnia and ten grains of tartar emetic were boiled in an ounce of distilled water. Nearly a clear solution was obtained. When cold, crystals were deposited, which, on being tested, showed the presence of both antimony and strychnia, the latter almost more distinctly than by itself. The crystals were remarkable; they were neither the prismatic crystals of strychnia, nor the octahedra of tartar emetic, but apparently some combination of the two substances.

2. One grain of strychnia and ten grains of the orange sulphuret of antimony were boiled as before. When cool, no crystals were obtained, but simply a deposit, apparently identical with the sulphuret. On testing this, the presence of strychnia was shown even through the orange-colored mass. The object of using this substance was to learn whether antimony, when in combination with sulphur, a circumstance not unlikely to happen in the decomposing body of Cook, would in any way affect the strychnia.

3. One grain of strychnia and one grain of tartar emetic were boiled in two ounces of distilled water. Very nearly the whole of the strychnia dissolved. No crystals were deposited on cooling, but a slight amorphous deposit, rich in antimony, had collected upon the surface of the dish. A portion of the liquid was evaporated and tested for strychnia, which was shown most distinctly. The liquid was now examined for antimony; on adding sulphuretted hydrogen very faint traces were shown; for greater certainty, some of the liquid was transferred to a clean Marsh's apparatus—antimoniuretted hydrogen was obtained, which, being burnt, afforded a stain, which was subsequently found to be antimony. To the rest of the liquid, ammonia was added; after a short time, long shining needles were formed, these, being separated by filtration, were found to be strychnia.

Perhaps the point most worthy of notice in this experiment, is the greatly increased solubility of strychnia in presence of antimony, which gives rise to thoughts as to what might take place in the yet living body—how far the system might be drained of the poison by the energetic eliminating powers of antimony. Not unworthy of attention also is the nature of the compound formed, and which is retained in the solution.

4. A drop of a solution, which contained the 1-250th part of

a grain in each drop, was placed in the centre of a capsule and carefully evaporated; a quarter of a grain of tartar emetic was added and two drops of sulphuric acid; these were intimately mixed; on adding the bichromate of potash very indistinct evidence of strychnia was given. By using more bichromate of potash and a little more acid, the color was somewhat more developed, but only for an instant, the whole quickly becoming green. On repeating this experiment several times, in varying proportions, it was found, that although the evidence of strychnia was rarely entirely lost, it did not give satisfactory proof of its presence. Thus it was, it may be presumed, that in the earlier experiments, the presence of antimony (tartar emetic ?) was supposed to invalidate and render the test useless. But, as before observed, no chemist would think of testing for a substance under circumstances like these. There is a long list of substances which would act in a similar manner; in fact, any body capable of deoxidizing the chromic acid liberated by the sulphuric, will mar the test more or less. In this instance, it may be presumed, that the oxide of antimony set at liberty by the sulphuric acid, is raised to a higher oxide (antimonic acid) at the expense of the chromic acid. The strychnia, however, in every case remains unchanged, and is there still—by supersaturating with ammonia, as recommended by Mr. Rodgers, and agitating with chloroform, the strychnia is recovered, in no way the worse for its companionship.

Discarding theory, an experiment was made to ascertain whether, after the colors have been produced in the ordinary manner, the strychnia may even then be reproduced, which ended in a negative result.

To determine further, whether the prevention or masking of the test, when tartar emetic was present, really depended upon the oxide of antimony, an experiment was made, in which bitartrate of potash was added, in lieu of the tartar-emetic—these elements (potash and tartaric acid) being in combination with the antimony. As anticipated, no effect whatever was produced, the colors coming out as perfectly as though this body had not been present.

While these experiments were being proceeded with, a bottle containing strychnia and some strong solution of sulphide of am-

monium, was brought to me by Mr. John Randall, of Portman Street, who had mixed these ingredients together, and had submitted the mixture to an elevated temperature for some hours, with a view to ascertain what effect this agent might have upon the poison, as one with which the latter might come into contact in the case of decomposing structures. On evaporating a small portion of it in a watch-glass, and testing in the usual manner, no satisfactory evidence of strychnia was afforded, less even than in the case of tartar emetic. Believing that this result might be due to the presence of sulphur acting analogously to the oxide of antimony, a little dilute acid was added to a portion of the same solution. The sulphur separated; on filtering the liquid, and evaporating a little of the filtrate and testing it as usual, the presence of strychnia became distinctly evident.

*St. Mary's Hospital.*

Since the preceding was in type, a letter, read before the Royal Society, signed W. B. Herapath, has come under my notice.

This eminent toxologist states that by the formation of Iodostrychnine "it is possible to recognize the 10,000th part of a grain of strychnia in solution."

The crystals are recognised by their optical properties when examined by the polarizing microscope.

---

## ON THE PRECIPITATION OF PROTOCHLORIDE OF ANTIMONY BY WATER.

By M. E. Baudrimont.

Protochloride of antimony, when exposed to the air, deliquesces without decomposition; and if a certain quantity of water be added to it in this state, it gives an abundant white precipitate, known by the name of *powder of Algaroth.* In this case the water decomposes the protochloride of antimony into a precipitate of hydrated oxychloride of that metal, and muriatic acid which remains in the liquid. The powder of Algaroth may be redissolved in the same liquid in which it was formed by the addition of a little muriatic acid, and the precipitate may be reproduced by a fresh addition of water. The author has repeated this experiment twenty times upon the same portion of

protochloride of antimony, but at each operation it was necessary to increase the quantity of liquid employed.

The explanation given by the author of these curious reactions is as follows:—Protoxide of antimony is one of those compounds placed at the extreme limit of acids and bases, the parts of which it can assume by turns. In presence of muriatic acid it will exert a property in antagonism with the latter, and will be basic. In the presence of water, on the contrary, it will change its part, and become acid in relation to this, which will act as a base. Now the acidity or basicity of $Sb^2 O^3$ will depend on the proportions of water or muriatic acid which it encounters. When the acid predominates, it will become basic; by making the water predominate, $Sb^2 O^3$ will be converted into an acid. A new addition of ClH will again change the office of $Sb^2 O^3$, and so on.

A mixture of 100 parts of water and 15 parts of muriatic acid with 16 equivs. of water, will keep protochloride of antimony in a solution which is on the brink of precipitation; the addition of a drop of water whitens it, and a drop of acid restores its limpidity. These proportions of water and acid are, therefore, as it were, the measure of their respective forces as chemical agents.—*Chem. Gaz.*, July 1, 1856, from *Comptes Rendus*, May 5, 1856.

# Varieties.

*On the employment of Hyposulphite of Soda in Analytical Chemistry.* By Dr. W. Vohl.—The author recommends, with Himly, the more frequent employment of hyposulphite of soda in analysis, instead of sulphuretted hydrogen. According to him, it can also be used to evolve sulphuretted hydrogen: if a piece of zinc is placed in dilute hydrochloric acid, and a few drops of a solution of hyposulphite of soda added, sulphuretted hydrogen is evolved. If now to this mixture a solution of salt of lead, bismuth, cadmium, &c., is added, the sulphurets of the corresponding metals are precipitated.—*London Pharm. Jour. from Ann. der Chem. und Pharm.*

---

*Characters of the Flame of Bisulphide of Carbon.*—In most kinds of flame red and yellow light preponderates so largely, that the chemical and fluorescent action is very small. Babo and Müller find that the flame of a mixture of binoxide of nitrogen and bisulphide of carbon differs in this respect from others. Quinine-solution, fluor-spar, solution of chlorophylle in ether, and uranium glass, illuminated by this flame, present the phenomena of fluorescence in a high degree.

The prismatic analysis of this light gives a perfect spectrum, in which the violet portion is unusually intense. The spectrum does not present black lines, but three bright lines, two in the yellow and one in the green, one of the former being the brightest and one faintest.

This flame was found to have a very powerful photographic action. Distinct pictures could be obtained on collodion by exposure for one second, when the object was from a foot to a foot-and-a-half from the flame, with a consumption of two litres of the mixture, while the flame of coal-gas in an argand burner fed with oxygen in the centre, produced no effect within ten or fifteen seconds. Drummond's lime-light produced only a faint effect, and the flame of phosphorus in oxygen produced in ten seconds an effect only equal to that of the mixture in one-and-a-half second.

The greater action of this light might be partially owing to the quantity of light generated by the rapidity of the combustion, but experiments with a regulated flame one-and-a-half inch long, showed that the photographic action was, after ten seconds, nearly as great as that of the flame of phosphorus in oxygen, and consequently, that the chemical energy of this flame is not proportionate to the luminous intensity, and is much greater than that of any flame hitherto examined.—*London Pharm. Journal.*

*Manufacture of Chinese Porcelain.*—In presenting to the Academy of Sciences the important work of M. Stanislas Julien on Chinese porcelain, a work mentioned in my last communication, M. Chevreul gave a brief review of its contents.

The art of making porcelain has been carried back to an exaggerated antiquity. It is now demonstrated that the earliest porcelains were made in China at an epoch between 185 B. C. and 87 A. D. The porcelain vases found in the tombs of Egypt are not of the antiquity attributed to them. M. Julien has contributed not a little to correct this error.

The Chinese author passes in review, according to the order of time and place of fabrication, the different porcelains most renowned in China. A chart of that empire indicates the location of the ancient and modern manufactures, adding much to the interest of the text. The idea of this is due to the learned translator. The processes of manufacture are described with clearness and method, and fourteen plates are reproduced from the original work. Finally the very precise notes of M. Salvétat, dissipate the doubt in which the text might leave the reader.

The interest of the book is not limited to an exhibition of the manufacture of Chinese porcelain, for M. Julien, in annexing to his translation of the *Art of making Japanese Porcelain*, has done all which depended on him to render his book useful to those who consult the book from an interest in the history of the art or in the ceramic industry.

M. Julien has also given the means of comparing the processes of China and Japan with those of Europe; a task entrusted to M. Salvétat. The analogies and differences of manufacture could not be shown with more clearness than is here done by the skilful chemist of Sèvres. The Chinese paste, like the European, is composed of a variable mixture of *kaolin*, that is, of a material infusible in the heat of the porcelain furnace, and of material which is fusible; the glazing is of fusible material. This is the analogy. The difference is that the fusible material mixed with the composition in China is flint, but at Sèvres it is composed of sandy matter coming from the washing of kaolin and chalk. The glazing of Chinese porcelain is flint mixed with lime and frequently with frit. The glazing at Sèvres is of pure flint. The porcelain of China is less resistant to fire than that of Sèvres. The Chinese do not, like the Japananese and Europeans, apply the glazing to the biscuit. There are other differences in the application of the coloring matters and in the composition of some of the varieties. The typography of this work does honor in every respect to M. Mallet-Bachelier.—*American Journal of Science and Arts.*

---

*Peculiar arrangement of a Voltaic Battery.*—This battery is designed for medicinal uses. It has been contrived by a constructor at Paris, M. Breton, and is maintained in a state of constant moisture with chloride of calcium. For one of the poles there is a mixture of copper filings with saw-dust, the

latter designed to separate the metallic particles,—the filings are mixed with a solution of chloride of calcium. The other pole is a similar mixture in which the copper is replaced by zinc filings. These two preparations placed in a vase and separated by a porous cell, make a battery which has the same intensity of action on account of its constant humidity and the indefinite number of its elements.—*American Journal of Science and Arts.*

---

*Paper from Jute.*—M. D. L. NASH, writing from Chester, makes the following suggestion :—" Jute is one of the most remarkable articles of commerce in Liverpool. It is an East India grass in bales, of which (according to Braithwaite Pool's valuable work on the commerce of Liverpool,) there are nearly 100,000 bales annually, the average selling price £20 per bale. This grass is sent to Dundee and the north, and the fibre so resembles caterpillar's thread, that it is used to adulterate silk. It is made into coverings called " baggings," to serve as wrappers for the American cotton. It is sent back to Liverpool so manufactured, and exported to South America, where it is filled with the cotton, sent back in cotton bales to Liverpool, thence to Manchester, and finally finds its way to the paper makers. Now there is no reason why an ample supply should not be had for paper : and perhaps a notice of the matter may obtain the attention of the scientific."—*Liverpool Northern Times.*

---

*The Telegraph in Switzerland.*—The telegraph in Switzerland is an institution that is much more successful than its polytechnic school promises to be. If even I felt competent to describe its perfect technical operation, I should not enlarge on this subject, as it is well known in America; but the liberality of the institution and the pecuniary results obtained from it, are worth mentioning. 25 words or less are uniformly paid by 1 franc, (17¾ cents,) whether the message has to go 150 or only 2 miles. The public are induced by this cheapness to use the telegraph as freely as they use the mails, and the result is that the administration of the telegraph, which is under the control of government, has a surplus of cash in its coffers.

Almost every small town of 3000 to 5000 inhabitants has its telegraph office ; of course, it would not pay to have a special telegraph office in each of these places, and therefore, the officers appointed by the central post-office are at the same time officers of the telegraph, though their duties concerning the expedition of letters often prevent them from attending to the telegraph ; but as the administration of the telegraph pays them partly, according to the amount of messages received at their offices, they have to provide for the performance of these duties ; they, of course, seek to supply them by the cheapest clerks ; they can have and find them in their wives, sisters, or daughters, and I have been assured by one of the superior officers of the telegraph, that at those offices where ladies are the performers, the business is generally done more perfectly than where men are exclusively appointed to attend.—*Journal of Franklin Institute.*

*Arrow Root.*—It is stated that the arrow-root crop of the Bermudas is an almost complete failure, in consequence of the severity of last winter. We hope that this fact will induce greater attention to the culture of this popular and most useful fecula in Georgia and Florida, where it has been raised in small quantities for some time past. It is most desirable that we should be dependent on foreign sources for as few as possible of the articles of the materia medica, and the domestication of the large number of foreign articles which can be profitably cultivated on our own soil, is a subject deserving the consideration, not only of pharmaceutists, but of agriculturists and political economists also.— *Virginia Medical Journal.*

---

On Chinese Alum*.—About eleven hundred tons of alum have been exported [from Ningpo] within a short period, chiefly to India. This mineral is largely employed by the Chinese in dyeing, and to some extent in paper-making as with us. Surgeons apply it variously after depriving it of its water of crystallization, and in domestic life it is used for precipitating vegetable substance suspended in potable water. It is used also by the Chinese in a manner peculiar to themselves. Fishermen are usually provided with it, and when they take one of those huge thizostoma, which abound on the coast, they rub the animal with the pulverized styptic to give a degree of coherence to the gelatinous mass. Architects employ it as a cement in those airy bridges which span the watercourses. It is poured in a molten state into the interstices of the stones, and in structures not exposed to constant moisture, the cohesion is perfect, but in damp situations it becomes a hydrate and crumbles, a fact of which the whole empire was officially informed by the government, about thirty years ago. It was discovered that water had percolated into the mausoleum of Kiaking, having been built too near the mountain-side, the alum cement imbibed moisture, segregated and opened the way for water to enter the tomb. In those peaceful days, such an event was of such importance as to call forth edicts and rescripts, memorials and reports in succession for several months. The son-in-law of the deceased monarch, to whose care the construction of the edifice had been entrusted, was fined and degraded, and a statesman from Foh-Kien, acquainted with the properties of alum, was appointed to remove it a short distance from the mountain.

Alum was first introduced into China from the West, and until a comparatively recent period, the best kind, called sometimes Persian, and at others, Roman alum, was brought from Western Asia. Numerous localities, where an inferior article is manufactured, are mentioned in the Pharmacopœia, viz., Shan-tung, Shan-se, Kiangsu, Hu-kwang, Sz'-chuen, also in the south-western frontier and in Tibet. That from Sz'-chuen is represented as having the property of converting iron into copper, or of coating

* Dr. Macgowan's Chinese Serial (published at Ningpo,) quoted in the North China Herald, Feb. 23, 1856.

iron with copper, by placing the former metal in a solution of rice-liquor and alum, the stone of that province. The most recent editions of works on Materia Medica contain no reference to the mines in this province, the products of which have surpassed in quality the foreign, and rendered its importation unnecessary. From this, and from other circumstances, it is certain that the works, which we will not describe, have not been long in operation. There are in the Sung-yang hills, bordering on Foh-Kein, in the district of Ping-yang, Wau-chau prefecture, and in close proximity to Peh-kwan harbour (27° 9′ 10″ N., 130° 32′ 6″ E.)

The locality has been visited by one foreigner only, to whom we are indebted for most of the following particulars. About two months ago he started from Chih-ki, bight in Lannai harbor to which Ningpo boats resort for this commodity to the northward of Peh-kwan. Three hours' hard walking over a succession of precipitous hills crossed by stone steps and pathways, brought him to the mines. Ten alum-making establishments were in operation, which, with the exception of one on a hill opposite, occupied about a mile of the side of a lofty hill. They were adjacent to the quarries, from which the alum stone seemed to crop out of decomposed rock of the same lithological character. The stones were thrown into a fire of brushwood, where they burnt with a slight lambent flame, and as they cracked, the fragments were taken out, broken into small pieces, and macerated in vats. Subsequently the disintegrated mineral was thrown with water into a vessel having an iron bottom, and sides of wood, and boiled for a short time. The lixivium was then poured into large reservoirs, where it crystallized into a solid mass. Blocks of alum weighing about fifty catties each were hewn out of the reservoir, and carried in this state in bamboo frames, one on each end of a porter's pole to the place of shipment, where it is broken into fragments. When not designed for immediate exportation, the blocks are stored away for drying. On reaching the depot, the alum is found charged with a double quantity of moisture, the porters being obliged to deliver a certain weight, they slip their burdens in the mountain streams which they pass in their journey. Judging from the number of laborers engaged in transporting the mineral on the day of our informant's visit, the quantity brought from the works could not be less than eighteen tons. The quantity consumed by the dyers of Ningpo prefecture alone, being nearly 22 tons per annum, is corroborative of this estimate. The supply is literally inexhaustible. Five dollars and a quarter a ton at the landing, would afford the manufacturer a fair profit. It often fetches much more, as there has been an increasing demand for the article, owing to the greater facilities afforded for exportation from Ningpo in foreign vessels.

The Wan-chau alum is equal to the best Roman,—a roseate tint in some specimens, indicate the presence of minute quantities of iron.

We have no means of ascertaining the precise geological position of the rock from which this alum is procured; some circumstances seem to indicate it to be a new mineral. It is stated that no potash nor any other ma

terial is employed in the works. Granitic and porphyritic rocks abound in the vicinity, and some parts of the district produce iron and silver. According to the Wan-chau topography, the working of silver was discontinued in the reign of Wan-lih, (1615,) in consequence of imperial prohibition. This part of the coast has recently become the seat of poppy cultivation for the bane of the Chinese race.

As a contribution to the physical description of the alum district, we would add that the typhoon of September last was preceded by a rising of water in wells and ponds many miles inland. When the cyclone reached the coast, it submerged about a hundred square miles, occasioning a vast destruction of life and property. The waters of the sea were retained in the country by strong easterly winds for several days, leaving a strip of land bordering on the sea quite dry.—*London Pharm. Journal, July* 1856.

---

*Dr. Boucherie's Patent Process for Preserving Wood from Decay.*—This patent is for an important improvement in the process of preparing timber, so as to preserve it from decay.

It is the invention of the eminent French chemist, Dr. Boucherie, who has devoted nearly twenty years in bringing it to perfection.

The system of Dr. Boucherie accomplishes two objects:—first, that of expelling the sap; and, secondly, filling the peres of the timber with a preservative solution.

The manner in which this is effected is by applying the preserving fluid under pressure, so as to cause it to pass longitudinally along the fibres. The preserving fluid thus forces the sap out before it, and occupies its place.

The advantages which would result from expelling the sap, and replacing it with an antiseptic fluid, have been long known, and the idea of effecting it by applying the fluid under pressure at the end of a piece of timber is not new, having been suggested and patented many years ago by Mr. Bethel. But the means then used did not accomplish the object in such a manner as to admit of its commercial application.

Hence the more expensive process of creosoting has been adopted—where the timber is totally immersed in the oil under pressure—which does not permit the sap to escape.

Dr. Boucherie's process has been attended with complete success. The apparatus employed, is of a very inexpensive character, and may be erected in a few days; it is capable of application on the most extended scale; and it is, in fact, very extensively employed at this time in preparing sleepers and telegraph posts for the French railways.

When the timber is under operation, the sap runs out from the ends in a clear stream, showing the amazing quantity of this fluid which is contained, and exhibiting the tubular structure of the wood, in the most striking manner; in fact, the preserving fluid will traverse a tree twelve feet in

length, with less pressure than is required to force it laterally through a plank three-quarters of an inch in thickness. When the sap is forced out the preservative fluid follows it, and its presence at the ends of the wood is ascertained by a chemical test.

Thus the sap and fermenting juices become completely expelled, and the timber becomes saturated throughout its length with the preserving fluid.

Important advantages arise in the employment of this process in this country. First, it may be applied successfully to Scotch fir, beech, elm, and other home-grown timber; secondly, it is not necessary that the wood should be dried or seasoned before being prepared, but, on the contrary, the operation is best effected within a few weeks after the tree has been cut down; thirdly, any cheap antiseptic fluids, such as solutions of sulphate of copper, or chloride of zinc, become perfect preservatives when applied in this manner; and, fourthly, no heat is required, and the wood is not rendered inflammable.

The result is a saving in first cost of about one shilling per sleeper as compared with Baltic timber creosoted; while the durability thus attained has been fully ascertained by the extensive trials already made in France, which will be further described.

*Success of the System in France.*—The first report upon this process was made in the year 1841, by a committee of the French Academy of Science, M. Arago being chairman, upon the occasion of a pamphlet on the subject by Dr. Boucherie being read before that distinguished body, and which was consequently ordered to be inserted in the "*Recueil des Savants Etrangers,*" and copies to be forwarded to the Ministers of Agriculture, Commerce, Public Works, Marine, Finance, and War.

In the year 1850, the French government appointed a commission of distinguished engineers of the Points et Chaussees, and again in 1852, the principal officers of Genise, to minutely investigate and report upon the merits of this inventien, and which they accordingly did; the reports on both occasions being favorable to Dr. Boucherie's invention; while, at the close of the recent Exposition, the French government marked its sense of the public benefit derivable from it by awarding to its inventor, the rare distinction of the large gold medal of honor, of which there were only four conferred on the representatives of the whole of France.

*Duration of Sleepers prepared by this Process.*—In the year 1846, 80,000 sleepers thus prepared, were authorized to be laid down upon the Northern Railway of France, together with a certain quantity of unprepared sleepers.

In this instance, the Company chose wood that decays easily, and which, on that account, had been rejected for durable works. They employed beech, pine, alder, elm, and birch.

These sleepers were inspected every year, and each time were found in a perfect state of preservation. In May, 1855, Dr. Boucherie being desirous of exhibiting in the Exposition some wood prepared by this process, had a few of each kind of these sleepers taken up, and they were found in every

instance to be in as perfect a state as when first laid down; the bark was unaltered, exhibiting two letters, the initial mark of the contractor, as clear and visible as when first impressed, while those sleepers which had been laid down unprepared had long since been reduced to decay. Upon these results being established, the greatest French Railway Companies, such as the Northern, Eastern, Nantes, &c., came forward, and required the immediate application of this process to the timber used upon their lines.

The following is an extract of a report upon the subject addressed to the jury of the late Exposition, by the administrators of the Northern Railway of France:—

"The sleepers prepared by Dr. Boucherie's process are preserved in an absolute manner, it being impossible to foresee a limit to their duration, seeing the present perfect state of preservation exhibited by those sleepers laid down eight years ago. The Northern Railway Company has adopted this process in preference to all others.

"Since the year 1853, the Northern Company has ordered more than 300,000 sleepers prepared by this system, and further orders would have been given, if they had found contractors disposed to deliver upon the same terms; however, at the present time tenders are required for more than 200,000 of those sleepers."—September, 1853.

*Telegraph Posts.*—The principle, as applied to the use of telegraphic posts, has been attended with equally favorable results, both as regards durability and economy. In the year 1846, the French Government substituted white pine posts prepared by this process, for the usual oak posts, for telegraphic wires on the Rouen line, and they are at the present time in as perfect a condition as when first erected.

This proves, and it is of importance to know, that timber thus prepared is equally efficacious when buried in dry or damp earth, and this is also exemplified daily by the telegraphic posts placed all over the French territory. Mr. Alexander, inspector of telegraphic lines in France, officially reported the costs of the two kinds of posts employed on that line as follows;—

| Prepared pine telegraph posts. Feet. | Unprepared oak telegraph posts. |
|---|---|
| Ordinary posts 5½ (4s. 5d.) | against 16fr. (12s. 9d.) |
| Winding posts 9 (7s. 3d.) | " 40fr. (£1 12s.) |
| Crossing posts 16 (12s. 0d.) | " 70fr. (£2 16s.) |

The following letter on the subject is from the administration of telegraphic lines in France:—

"*Paris, August* 14, 1855.

"Sir,—All the telegraph posts in the French Empire have been prepared by your process.

"The administration had 200,000 on the 1st of January last, and since that time have caused 32,000 additional posts to be prepared.

"The preservation of the posts thus injected with sulphate of copper is

rendered complete, although the first were prepared and laid down in the year 1846.

"It is with pleasure, doctor, that I am enabled to give you this information, in order that you may communicate it to the members of the jury of the Universal Exposition.

(Signed,) "H. DE VOUGY,

"Chief Administrator of Telegraph Lines, Minister of the Interior."

"To DR. BOUCHERIE."

*Journal of Franklin Institute, and Herapath's Journal.*

---

*On Soft Sulphur.* By E. BAUDRIMONT.—When fresh soft sulphur is brought in contact with essence of turpentine in a closed tube, and left to itself for five or six days, the fragments of sulphur become opake, and covered with a great number of small, transparent, and brilliant crystals, which also clothe the walls of the tube. In a few months these crystals acquire a considerable size, which they do not afterwards appear to exceed. They are modifications of the symmetrical octohedron, which is always obtained when sulphur is crystallized at the ordinary temperature. As this crystallization takes place at the surface of the sulphur, and not in its mass, it cannot be attributed to a direct conversion of the soft sulphur into octohedric sulphur, but rather to the greater solubility of the former in turpentine and its return to the latter condition in this fluid, which would necessitate the precipitation of a portion of the body dissolved in the turpentine.

The author found that at 59° F. the same quantity of turpentine dissolved in twenty-four hours 1000 parts of ordinary sulphur and 162 parts of soft sulphur. At 212° F. the soft sulphur appears to become converted into ordinary sulphur; and soft sulphur appears to possess different degrees of solubility, according as it was exposed to different temperatures, and as it was more or less fresh.—*Chem. Gaz. June* 1, *from Comptes Rendus, April* 28, 1856.

---

*On the Bichromate of Potash and Sulphur Acid Test for Strychnine.* By C. W. BINGLEY, Ph.D., F.C.S.—When strychnine in powder is moistened with a single drop of undiluted sulphuric acid, and a small fragment of bichromate of potash is placed in the liquid, a beautiful and most intense violet tint immediately appears at the points of contact, and is speedily diffused over the whole liquid, disappearing entirely in a few minutes (*vide* Chem. Gaz., vol. x. p. 198, and *Ib.*, vol. v. p. 15), leaving the liquid colored a deep yellow-orange color by the bichromate of potash.

But if a considerable portion of tartarized antimony be present in solution, along with a small portion of strychnine either in solution or in powder, the violet tint is not produced, as in the case before alluded to, but a pale greenish color, which is much more persistent, is apparent.

With the chloride of antimony, the presence of strychnine, even in a large quantity, fails entirely in producing the violet tint with the addition of sulphuric acid and bichromate of potash.—*Chem. Gaz. June* 16, 1856.

---

*Determination of Butter in Milk.* By M. MARCHAND.—Marchand's lactobutyrometer consists of a straight glass tube as the vessel of reception, which terminates in a narrower glass tube closed on one side. Up to 19-20ths of its contents it is divided into 3 equal parts, of which that nearest the opening again has its three upper tenths divided into 100 parts, 10 of which are carried on beneath the line of demarcation.

For use, the first division is filled with milk, to every 10 cub. centims. of which a drop of caustic soda is added; this is covered with the same volume of ether, the two fluids are thoroughly mixed together, and the last division is then filled with alcohol of spec. grav. 0·864 to 0·833°, and the whole well shaken together. The instrument is then immersed in a water-bath of 109°·4 F., and left there in a vertical position until the temperature of the water-bath has fallen to 86° F. The volume of fat which has separated on the surface is determined by reading off the degrees which it occupies from above downwards to the lowest level of the meniscus. The corresponding weight of butter for each kilogramme is found in a table.—*Chem. Gaz. July* 1, *from Journ. de Chim. Méd. Nov.* 1856.

---

*On the Prevention of the Oxidation of Metals.* By H. DRAPER.—Those familiar with electrical science are well acquainted with the fact that zinc exercises positive relations with regard to most other metals. In other words, it possesses the power of keeping them in a negative state when in contact with them.

In this negative state they are incapable of entering into combination with oxygen, and this circumstance may be applied with much advantage to the prevention of the oxidation of machinery, especially such parts of it as, in the case of marine engines, are liable to come in contact with water. Many instances will at once suggest themselves in which much manual labor might be saved by the simple contrivance of appending either a ring or slip of zinc to the metal to be preserved bright. It would be especially applicable in the case of bayonets and rifle barrels, and a zinc edging to a scabbard would prevent the rusting of the sword.

I have employed this method for some years with perfect success in the case of articles of polished steel, which, for the sake of experiment, were placed in precisely similar circumstances with others not so protected, and retained their brilliancy, while the others became rapidly covered with a thick coating of oxide. The useful properties of "galvanized iron," *not* improperly so called, are due to the same cause.—*London Pharm. Journal.*

---

*The natural state of Hippuric Acid.*—So great differences exist in regard to the proportions of hippuric acid contained in the normal state in the

urine of the horse, that a chemist, M. Roussin, has undertaken to find out whether these differences are those of calculation or are really well founded. After numerous determinations, he has recognized the fact that the proportions of hippuric acid vary like the urea according as the horse is at work or rest. The following table contains the results of the trials. The urea has been determined in the condition of dry nitrate.

| | | Hippuric acid in 1 litre. | Nitrate of urea in 1 litre. |
|---|---|---|---|
| 1. | Omnibus horses, . . . | 7.8 grammes | |
| 2. | " " at work, : . | 10.0 " | 18 grammes |
| 3. | Arabian stallions, completely quiet, | 0.0 " | 32 " |
| 4. | " " " " | 0.0 " | 35 " |
| 5. | " " " " | 0.0 " | 33 " |
| 6. | " " " " | 0.0 " | 34 " |
| 7. | " horses at work, . . | 5.0 " | 21 " |
| 8. | " horses fatigued by a long course, | 13·0 " | 12 " |
| 9. | " horse after a very long course, | 14.0 " | 15 " |

Hence it is clear that horses fatigued produce much hippuric acid and comparatively little urea. Horses well fed and quiet produce little or no hippuric acid. Urea on the contrary is found in their urine in very large proportions. Its limpidity may be the index. If the liquid is clear and deposits little carbonate of lime, it has much urea and little hippuric acid; if it is muddy, it is certain that there is much hippuric acid. Respiratory activity and the employment of muscular force accordingly seem to transform urea into hippuric acid. Rest, on the contrary, leaves the urea intact, and does not appear to favor its transformation into hippuric acid.—*American Journal of Science and Arts.*

---

*Dr. McIntire's Anti-Dyspeptic Pill.*—We perceive that the formula for the above pill, published in our last No., is rendered by some typographical errors entirely unintelligible. It should be as follows: ℞ Potass. sulph. ʒij; Cubeb. pulv. ʒj; Ginger. pulv., Rhei pulv. a a ʒss; Ol. Gaultheria gtt. xx; Mucillag. Acac. q. s.; M. Ft. Pill No. lxx. Dose:—one before each meal.—*New Hampshire Jour. of Med.*

---

*The Adhesive Iodine Paint.*—The following is the formula for preparing an iodine paint, which is made adhesive by the addition of mastic, and is thus prevented from spreading too much when applied to the skin. As the value of this application in chronic inflammations of the eyelids is becoming recognized, it is evidently important that we should be enabled to apply the paint so as to prevent its spreading on the more delicate structures in the neighborhood. ℞ Spirits vin. rect. ʒij; spirits. æth. nitr. ʒiv; mastic, ʒss.; iodinii ad sat. This is the preparation used at the Moorfields opthalmic hospital with great success as a counter-irritant.—*Virginia Medical Journal.*

## NOTICE

*To the Pharmaceutists and Druggists of the United States.*

AMERICAN PHARMACEUTICAL ASSOCIATION.

The third Article, 1st Section of the Constitution, requires the President, at least three months previous to the annual meeting, to publish a call in such Journals as he may select, stating therein the object of the Association and the conditions of membership. In compliance with this duty, you are hereby notified that the next Annual Meeting of the Association will convene in the city of Baltimore on the second Tuesday, (the 9th) of September, at 3 o'clock, P. M.*

The objects of the Association are to deliberate on the condition of our profession, the advancement of pharmaceutical knowledge, and the elevation of the professional character of Druggists throughout the United States. The following extracts from the Constitution exhibit the Conditions of Membership.

*Conditions of Membership.*

SECTION 1. Every apothecary and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, who, after duly considering the objects of this Association, and the obligations of its Constitution, is willing to subscribe to them, is eligible to membership.

SECTION 2. The mode of admission to membership shall be as follows: Any person eligible to membership may apply to any member of the Executive Committee, who shall report his application to the said committee. If after investigating his claims they shall approve his election, they shall, at the earliest time practicable, report his name to the Association, and he may be elected by two-thirds of the members present on ballot. Should an application occur in the recess, the members of the committee may give the approval in writing, which, if unanimous, and endorsed by the President, shall constitute him a member, and the fact be reported to the Association at the next succeeding meeting.

SECTION 4. Every member shall pay into the hands of the Treasurer the sum of two dollars as his yearly contribution. Members shall be entitled, on the payment of five dollars, to receive a certificate of membership signed by the President, one Vice President and the Secretary, covenanting in writing to return the same to the proper officers on relinquishing their connection with the Association.

SECTION 5. Every local Pharmaceutical Association shall be entitled to five delegates.

JOHN MEAKIM, President.

*New York, April*, 1856.

*[The place of meeting is the Hall of the Baltimore College of Dental Surgery, corner of Hanover and Lombard streets, Baltimore.—EDITOR.]

# Editorial Department.

AMMONIO-FERRIC ALUM.—The following addition to the paper of our valued contributor, at page 305 of the July number, arrived too late for insertion among the original communications, and as it adds to the value of that paper, we have preferred to place it here rather than postpone its publication till November.

*Addendum on Ammonio-Ferric Alum.*

By W. HODGSON, JR.

From want of time to satisfy myself in regard to some of the details, I omitted in my paper on the above article, in the last number of the American Journal of Pharmacy, to state certain precautions which are important in the preparation of that substance, in order to obtain an elegant salt. The excessive heat of the present summer for several weeks prevented spontaneous crystallization, the thermometer during that time ranging from 80° to 103° Fahrenheit, whereas it appears that the ammonio-ferric alum will not spontaneously part with its mother water and assume the crystalline form under ordinary states of the atmosphere, with the temperature over 80°. If artificial heat is applied, beyond a certain point of concentration, the salt falls down in a granular form very difficult of solution, and probably anhydrous, or nearly so, instead of having twenty-four atoms of water of crystallization. Again, if subjected to the direct rays of a hot sun, a change takes place which gives the crystals a very dark brown orange color, evidently from free oxide of iron. The solutions should, in order to avoid the tendency to develope free oxide of iron, be rendered acid by addition of a little sulphuric acid. The crystals first formed should be redissolved in an equal weight of hot water thus slightly acidified, and then set aside for spontaneous evaporation in a cool shady place with a current of air. They must be washed with cold acidified water, and pressed in bibulous paper, or something similar thereto. They are then of an elegant violet tint, and of a more or less regular octohedral form. In order to preserve this appearance (as they readily change by exposure to moisture and warmth) they should be kept bottled up.

---

AMERICAN PHARMACEUTICAL ASSOCIATION.—We take the opportunity which now offers immediately before the MEETING of this body, to again call the attention of members and others to the fact, and urge the acceptance of the invitation to attend it which has been extended officially by the President and Executive Committee to all respectable members of the Pharma-

ceutical body. It was the design of the founders of this Association, that it should gradually grow in numbers and influence until its action would be received as a fair exponent of the sentiments and wishes of the best educated portion of the profession, in reference to the reforms which might be needed. Hence it has been the constant aim of those having the management of its affairs to enlist the interest of pharmaceutists in every section of the union in its favor, so that their support and services may be available in the furtherance of its objects. Let us give an example, supposing the Association has extended its membership into every State. The time is approaching when the next decennial revision of the Pharmacopœia is to occur. The bodies represented in the Pharmacopœia convention are requested to prepare and forward such notes of revision of that work as they deem proper. One of the chief merits of a United States Pharmacopœia is, that it should embody a list of materia medica and medicinal preparations suited to the wants of every section of a country that embraces all climates from tropical to arctic. Now we contend that intelligent pharmaceutists, in the pursuit of their practice in the service of physicians, get a better idea of the wants of the medical profession than physicians themselves, as they are called on to supply those wants. Hence, if the Association should bring to bear its influence on this subject, it is presumed that a body of information could be collected that would very materially aid the Committee of Revision. It is in this way that the Pharmaceutical Society of Great Britain has been successful in promoting reforms. Its members extend throughout England and Scotland, and it is at this time employing its influence in aid of that noble work, the *fusion* of the three British Pharmacopœias into one great work, to represent the British Empire. Again we say to the brethren, attend the meeting; and to those who cannot come, yet who feel in harmony with the Association, we say join it in membership in the manner explained in the President's notice at page 477, and by thus countenancing it give their indirect aid.

---

Poisoning—Toxicology.—The crime of poisoning seems to be on the increase in England since the developements in the case of Palmer, which has become so widely known by his trial and execution. The attention of English pharmaceutists has been much attracted towards the chemical means of detecting poisons, and the journals teem with essays on reagents and antidotes. In view of the evils which result from the newspaper publication of the details of these trials being read and pondered on by evil-disposed and morbid-minded persons, who before may have had the half-formed idea of murder or suicide resting with them, druggists and apothecaries should be doubly careful in dispensing poisons of all kinds, and especially those potent agents like strychnia which are so easily abused. In the absence of legal enactments, it is to be hoped that their necessity will be superceded by a self-imposed carefulness in the vending of this class of

substances. It is also greatly to be desired that Pharmaceutists should give some attention to the detection of poisons, and familiarize themselves with antidotes, so as to render useful aid when called upon in emergencies.

---

*Hints on Various Subjects connected with our Business.* By A. I. Mathews & Co., Druggists and Pharmaciens. Buffalo. pp. 150. 12mo. 1856.

We have been amused as well as instructed in looking over this evidence of the enterprise of our friends Mathews & Co. who in issuing this little volume say, "It is to be presumed that we do not go to the trouble and expense incident to such a volume as this without some hope of remuneration in one form or another. We do *not* present this book to our patrons as an offering from an unmixed and entirely unselfish friendship. In fact we hope to 'make money' by it, in the same way we have practised heretofore, and found advantageous to both parties concerned."

The book commences with a history of the business stand of the firm, from the time it was burnt by the British in 1814 with the rest of Buffalo village to the present, with a description of the establishment as it now is, and its dispensing arrangements. Then follows an account of wines, liquors, perfumery, soaps, glass ware, brushes, spices, effervescing and other medicated waters, flavoring extracts, dietetic articles, etc. etc., concluding with the reasons of the firm for *not selling patent medicines.* The whole affair is so well "gotten up," is so full of useful hints and quaint humor, and evidences so much enterprize, that in spite of a little admixture of humbug we cannot but admire the tact manifested in the publication.

---

*Charter, Laws, and Code of Ethics of the Philadelphia College of Pharmacy, with Lists of Officers, Members and Graduates, and the Announcement of the School of Pharmacy, &c.* Philadelphia, 1856. pp. 28, octavo.

The members of the College are advised of the issue of a new pamphlet of By-Laws, etc., and those who may not receive it, will be supplied by application to the Secretary.